19-Nov-97

AMXSY-T

MEMORANDUM TO Ms. Renata Price, Assistant Deputy Chief of Staff for Research, Development and Acquisition – Science and Technology, 5001 Eisenhower Avenue, Alexandria, VA 22333-0001

SUBJECT: 4 - 6 Nov 97 Automated Configuration Management System (ACMS) Task Force Meeting

1. References:

a. Memorandum, Deputy Secretary of Defense, 2 Jul 97, subject: Policy for the Transition to a Digital Environment for Acquisition Programs.

b. 14 -16 Aug 97 ACMS Task Force Meeting Minutes.

2. The purpose of the ACMS Task Force is to prepare an Army performance specification. The specification describes the functional/performance requirements for configuration management/configuration status accounting, including the preparation of certified technical data packages, to assure full interoperability among AMC sites and the ability to interface with Army Contractor Integrated Technical Information Services (CITIS).

3. The purpose of this letter is two fold. The first is to provide you with a synopsis of the subject meeting, highlighting issues and concerns that we feel need HQ AMC clarification. The minutes of the meeting are attached as encl 1. The second is to provide an update on the status of the implementation of Joint Engineering Data Management Information and Control System (JEDMICS) that Mr. Dale Adams requested at the ACMS Task Force meeting held in Aug 97 (see reference 1.b. above). A point paper summarizing the changes in the status of the implementation of JEDMICS is attached as encl 2. Request that it be forwarded to Mr. Adams.

4. The most contentious issue from the November meeting centered around whether the Army, as a matter of policy, is going to use the recently published Department of Defense Interface Standard MIL STD 2549, Configuration Management Interface and its associated Data Item Descriptions, as the means of obtaining on-line access to or delivery of digital technical data. If the Army chooses to embrace this interface standard, a letter announcing this policy should be published. The implementation of such a policy would go along way towards meeting the goal spelled out in reference 1.a. of operating in a totally digitally environment by the year 2002 and the Army's goal of presenting a single face to industry.

5. Another issue from the November meeting that needs AMC reconfirmation is the definition of the end product of the tech loop process that ACMS should include as a requirement in the performance specification. Verbal guidance from HQ AMC (Mr. James Knowles) has indicated that this product should be a certified technical data package. This package would be integrated into the Pre-Procurement Input (PPI) being prepared by another system. For example, TACOM is conducting an Integrated Data Environment (IDE) PPI workflow effort that will rely on receiving this certified package from ACMS. AMCOM and CECOM are collaborating with TACOM on this effort.

6. The last issue from the November meeting is that the major subordinate commands (MSCs) need guidance on whether AMC is going to directly fund the acquisition and maintenance of ACMS systems. If the MSCs are expected to acquire and maintain their own system from within their existing resources, they need to know this so that they can plan and budget accordingly. At least one Technical Data/Configuration Management System (TD/CMS) has a year 2000 problem and they are counting on replacing it with an ACMS system.

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7. The projected date for the delivery of the ACMS Performance Specification is now 13 Mar 98. This one-month slip in schedule is due to adding an additional two-week cycle before each of the two remaining meetings. This time will be used to allow the MSCs an additional week to review the information to be discussed and provide written comments highlighting their comments and concerns. The other week will be used by BDM, the ACMS engineering support contractor, to organize the comments into briefing materials for a more orderly and efficiently run meeting. A revised schedule of the remaining tasks is attached as encl 3.

GORDON NEY
Chairman
Engineering Data Management Systems
Functional Coordinating Group

3 Encls

1. Minutes, 18 Nov 97, w/ 3 Appendices, wd Appendix B
2. Point Paper, AMXSY-T, 17 Nov 97
3. Revised Schedule

CF:
Commander, U.S. Army Materiel Command, ATTN: AMCRDA-TE (Mr. Jim Knowles), 5001 Eisenhower Avenue, Alexandria, VA 22333-0001
Director, U.S. Army Systems Analysis Activity, AMXSY-D (Mr. John McCarthy), Aberdeen Proving Ground, MD 21005-5071

18 Nov 97

EDMS FCG
ACMS Status Meeting
4 - 6 November 1997

Summary of Meeting

On the 4th, 5th, and 6th of November 1997, the Army Materiel Command (AMC) Engineering Data Management Systems (EDMS) Functional Coordinating Group (FCG) held a meeting at TACOM-Warren. Ms. Patricia Martinez, TACOM-Warren, TARDEC-Engineering Business Center- Electronic Data Interchange (EDI) team, hosted the meeting. The meeting's purpose was to accomplish the following:

- Report on the status of the Army's Automated Configuration Management System (ACMS) Performance Specification;
- Review ACMS products developed to date;
- Achieve consensus on the technical data management business problems, ACMS goals, and ACMS concept of operations (CONOPS); and
- Receive updates on Army Joint Engineering Data Management Information and Control System (JEDMICS) implementation efforts.

Mr. Gordon Ney from the U.S. Army Materiel Systems Analysis Activity (AMSAA) chaired the meeting. The main outcomes from the meeting were as follows:

- ACMS Task Force representatives disagreed on what constitutes common core data requirements for ACMS. One group favors a minimal, but undefined set of data elements. The other believes MIL-STD-2549 defines what should be the core data elements. A work group was formed to explore this issue and Mr. Ney will attempt to arrange MIL-STD-2549 training for the Task Force membership.
- The ACMS Task Force recommended that the EDMS Program Manager's (PM's) role be one of facilitating and coordinating individual Major Subordinate Command (MSC) implementations of ACMS, auditing those implementations, and validating that the MSC implementations are ACMS certified.
- The ACMS Task Force recommended that it assume the responsibility for developing a plan and supporting documentation that could be used to solicit centralized funding for ACMS. This responsibility was removed from the Task Force's original charter at a meeting in May 1997.
- The ACMS Task Force recommended that ACMS would be based on commercial PDM system(s) or equivalent.
- The schedule for developing the ACMS Performance Specification was revised to allow more time for MSC review and commenting on the expected 200 to 300 requirements, as well as packaging those comments for group review.

The meeting was well attended by approximately 40 representatives from the various Major Subordinate Commands (MSCs) and depots. Appendix A provides a list of attendees. Copies of presentations are provided in Appendix B. A zipped copy of all the portable document format (pdf) files associated with this set of minutes can be obtained at the EDMS FCG homepage:

(ftp://www-iea.ria.army.mil/outgoing/ai/eng_data/tacom-minutes.zip).

Day 1: Tuesday, 4 November 1997

ACMS Task Force Status Meeting Introduction

Mr. Gordon Ney opened the meeting by welcoming the attendees. Mr. Ney informed the Task Force that MG John Caldwell, HQ AMC, Deputy Chief of Staff for Research Development and Acquisition (DCSRDA), received an EDMS briefing on 17 October 1997, which included a short summary of ACMS. He also summarized the ACMS Task Force's recent activities and key events.

Two key events specifically discussed were the May 1997 ACMS status meeting when MG Beauchamp, as HQ AMC, DCSRDA approved a revised ACMS Task Force Plan of Action, and the August 1997 status meeting. Mr. Ney noted that at the May meeting, the scope of the ACMS initiative was expanded to include support of the Army Tech Loop process, as well as configuration management (CM). While the scope of ACMS expanded at that meeting, the initial objectives of the ACMS Task Force were reduced. The Task Force was directed to develop a performance specification. MG Beauchamp also directed that the EDMS PM would be responsible for implementing a standard ACMS across all MSCs. Mr. Ney also noted that at the August status meeting, the Task Force recommended that ACMS requirements development process needed to look to the future and be creative so as to break the existing document centric technical data management paradigm and transition to a product centric data management paradigm.

Mr. Ney then reviewed the agreed upon vision and fundamental concept of operations for ACMS. The ACMS vision calls for the following capability:

> *"ACMS will provide the required data when it is needed and in a form that the user can apply to accomplish the mission. The required data consists of all the engineering data necessary to completely define an item for the intended purposes of specifying, designing, analyzing, manufacturing, maintaining, sustaining, testing, inspecting, and dispositioning that item over its entire life span. The ACMS must also operate in a diverse Army environment, integrate with other MSC business processes, and communicate with other MSC, government and industry information management systems."*

The foundation for the ACMS concept of operations calls for a system of systems in which each site can establish required MSC CM functionality (site unique capabilities and processes) while sharing data via common core data requirements (data elements and capabilities). These common core data requirements not only support site to site data exchanges, but exchanges with contractors and other government entities as well.

Next, Mr. Ney briefed the planned path for achieving consensus on what ACMS should be and developing ACMS requirements. This path involved identifying critical technical data management business problems, establishing a vision for ACMS and specific goals to achieve that vision, developing a detailed ACMS concept of operations (CONOPS), defining the basic assumptions of an acquisition strategy, and developing requirements for inclusion in an ACMS performance specification. Mr. Ney indicated that this path represented a departure from the original plan, which depended too much on legacy requirements and processes.

Mr. Ney briefed the near-term schedule for developing the ACMS performance specification. By the end of the three days of meetings, it was apparent that the schedule needed to be revised. The new schedule is listed below.

Revised ACMS Schedule

11 November	Receive comments on business problems and CONOPS
13 November	Telecom with Gayle Booker and Jim Rickenbaugh on Configuration Management Information System (CMIS) requirements
14 November	Receive data call responses
26 November	Send out draft requirements for review and comment
15 December	Receive comments on draft requirements. Post on web site

12-16 January	Requirements Review Meeting at STRICOM. Possibly MIL-STD-2549 training
30 January	Send out draft Performance Specification for review and comment
13 February	Receive comments on draft Performance Specification
24-26 February	Performance Spec Review Meeting at Picatinny
13 March	Deliver Final Performance Specification

Mr. Ney's briefing included the agenda for the remainder of the meeting. He noted that Mr. Dale Adams, HQ AMC Principal Deputy for Acquisition intends to attend the last ACMS Task Force Meeting to see how the performance specification turned out.

Mr. Ney then briefed why the team had attempted to describe the Army's key technical data management business problems and why they had developed an ACMS CONOPS. The business problems were intended to focus ACMS on specific areas needing improvement. They articulate the business reasons for needing and justifying ACMS. Business problems also provide the basis for developing metrics to measuring success. The decision to produce a CONOPS grew out of the need to simplify the requirements development process and look forward. It also was suggested by several vendors and recommended as an approach at several conferences. The CONOPS was a natural part of the intellectual progression from business problems to a vision, from a vision to goals which interpret the vision, and from goals to a CONOPS which translates the goals into operational terms and illustrates how ACMS will support Army business processes. Performance requirements will evolve from the CONOPS, MSC input and other sources.

The business problems chart stimulated a brief discussion on the need for defining and measuring metrics. It was noted that metrics are necessary to justify investment in and continued funding of ACMS. Developing and measuring metrics will be difficult. As an example, it was noted that obtaining metrics for JEDMICS performance in support of administrative lead time (ALT) has been difficult because the services all define and measure ALT differently.

Two issues surfaced during the discussion as to why a CONOPS was developed. The first dealt with needing to keep the initial ACMS implementation effort focused. The effort can expand as the system matures and evolves, but the initial effort should not become too broad. This point surfaced again at other points in the meeting. The second issue revolved around the need to obtain PEO and PM buy-in to ACMS. It was noted that if the PMs are not shown a cost savings (or at least no additional cost), they will not pay attention to ACMS. Mr. Ney indicated that the Task Force would need to revisit the subject of how to deal with affected communities. (Task Force members in general are to staff and coordinate with affected communities at their respective sites).

Mr. Ney concluded his briefing with a brief discussion of the ground rules for the remainder of the meeting. He then turned the meeting to a discussion of technical data management business problems.

ACMS Technical Data Management Business Problems

Mr. Jim Cox of BDM began a discussion of technical data management business problems by proposing the following list of six high-level problem statements.

- Re-engineering or Re-validating Data Delays Replacement and Spares Acquisitions,
- Locating and Accessing Data from Multiple Repositories is Difficult,
- Systems are not Synchronized - Wrong Data Retrieved,
- Accessing Data by Dispersed Communities is Difficult and Time Consuming,
- Army Budgets and Staff Are Shrinking -- Efficiencies are Needed, and
- Army Commands have Different Infrastructures and Processes.

Additional detail was provided for each of these statements later in his briefing.

Generally, there was agreement that these represented valid top-level technical data management business problems, but the detail was incorrect or inappropriate in some cases. In particular, a sense existed that some of the details described problems, which ACMS could not be, expected to fix. There was also a concern that the problems would cause ACMS to focus on management of images rather than more sophisticated representations of the engineering data (e.g., CAD files).

As the Task Force debated the first problem, the discussion drifted into a wide range of topics covering the scope of ACMS, what should constitute the common core ACMS data, and identification of additional business problems. In the next few paragraphs corresponding to this segment of the meeting, the above three topics are briefly covered. In an effort to bring some focus to the remainder of the meeting, Mr. Ney proposed and ran a brain storming session to identify additional business problems that will be added to those identified in Mr. Cox's briefing.

ACMS Scope. Some Task Force members wanted to expand the perceived scope of ACMS to specifically include more elements of acquisition than just TDP assembly, review, and validation. In particular, they were looking to include management and dissemination of other acquisition data such as Statements of Work (SOWs) and Contract Data Requirements Lists (CDRLS). Other members sought to bound the scope to traditional configuration management of engineering data and the engineering component of Tech Loop (e.g., TDP assembly, review, and validation). The rationale for the later point of view stemmed from a perception that if ACMS became too large, it would never be fielded. The ACMS scope issue was never resolved, as it was overwhelmed by the next issue.

ACMS Core Data. The Task Force was decisively split on what constitutes common core ACMS data and how that data should be described. On one side, several members expressed a belief that MIL-STD-2549, *Department of Defense Interface Standard, Configuration Management Data Interface*, 30 Jun 97 defines the minimum core metadata which must be sharable within and outside the ACMS federation. On the other side, members indicated that they believe MIL-STD-2549 is both too restrictive and too extensive. This group's experience has suggested that weapon system PMs will accept engineering data in whatever form and with whatever metadata contractor's wish to provide. It was stated that PMs will not necessarily require contractor's to submit MIL-STD-2549 data packets. As a result, the second group recommended that ACMS be implemented so that it can accommodate data beyond what MIL-STD-2549 prescribes, while also limiting the required core set of data to a small collection of attributes (possibly including attributes not covered by MIL-STD-2549). No agreement was reached on this issue by the end of the meeting. A subgroup with representatives from the Technical Data/Configuration Management System (TD/CMS) sites was assigned the **action** to resolve the issue. The subgroup will consist of representatives from AMSAA, CECOM, AMCOM, TACOM-Warren, TACOM-ARDEC, SSCOM, and CBDCOM.

Additional Business Problems. During the course of the discussions on the proposed business problems, several additional problems were identified. These include the following:

- Non-standard engineering data management systems significantly complicate Army consolidations due to downsizing and reorganizations. The difficulty in integrating ATCOM and MICOM engineering data and data management processes was offered as an illustration of this problem.
- Some contractors are either refusing to provide identifying metadata, or are charging significant amounts to provide the data.
- It can be costly to pay contractors to convert engineering models of a weapon system to raster images.

Brain storming session. Following a break, Mr. Ney led the Task Force in a brainstorming session to identify additional technical data management business problems. The following list provides a summary of the problems surfaced:

1. MSCs are receiving engineering data and metadata from contractors in multiple formats and have no resources (people) available to prepare the data for inclusion in a data management system. A corollary to this is the lack of an Army or DOD standard format or way of buying electronic delivery of data.
2. Army consumers of engineering data such as depot personnel must use multiple data management systems with different data access schemes to find needed engineering data. This lengthens the time it takes to find and retrieve data, and in some cases precludes the user from obtaining access to the data at all.

3. Different engineering data management systems and processes at each site (e.g., TD/CMS is different at each site), increases the cost, time, and complexity of site consolidations due to reorganizations and downsizing. In other words, it is costly to move data from one TD/CMS to another. Both data and corporate knowledge get lost.
4. There is a disconnect between contractor and JEDMICS repository data and government configuration management data (TD/CMS data).
5. Historically, changes to engineering data have been controlled via several approval layers. Because the hierarchical approval process lengthens the time to make changes, IPTs are being empowered to manage their own data. In some instances, this results in changes being made by individuals who are unschooled in the discipline of configuration management and can result in inadequate control of the data.
6. A lack of confidence in the ability to find and retrieve data in real-time results in multiple copies of data that users attempt to maintain on their own. As a result, the locally held data becomes out of date and considerable time is spent determining if it is the correct version.
7. Army users of engineering data have no visibility of or access to embedded software technical data.
8. The Army technical data management system needs to be able to provide engineering data to users in the format required by the user regardless of the business process the user is supporting (e.g., procurement, manufacturing, or disposal).
9. At least one TD/CMS site is not Year 2000 compliant. No funds have been made available to fix TD/CMS and ACMS has been touted as the solution.
10. It is difficult to pull classified and unclassified engineering data together in designs because separate data management systems are required to manage classified and unclassified data.
11. The Army has the capability to perform configuration status accounting of As-Designed configurations, but has no ability to perform configuration status accounting for As-Built, As-Modified, or As-Maintained configurations. Often the As-Built data is not provided or is not updated as the result of post-deployment changes.

Mr. Ney gave the MSCs an **action** to provide written comments on the problems identified in the briefing. BDM has the **action** to revise the proposed problem statements based on comments received and add the new problems identified during the discussion and brainstorming session.

ACMS Vision and Goals

Mr. Jim Cox of BDM briefed the ACMS Task Force on a set of proposed goal statements that interpret and decompose the ACMS vision. The Task Force discussed each goal statement. The following reflects specific changes that were proposed by the Task Force during the meeting and issues that were raised. Additional written comments are to be provided from the Task Force members (as part of their review of the ACMS CONOPS) and will be incorporated at a later date.

To facilitate traceability to the original statements, each change is introduced by its corresponding paragraph number in Section 2 of the ACMS CONOPS and the identifying lead-in phrase. The ACMS CONOPS is attached as Appendix C. Additions are shown as italicized text.

Changes:

- 2.2.1. System of Systems. ACMS will be a *federated* system of systems that is scaleable and leverages the capabilities of existing government systems where feasible, cost effective, and necessary.
- 2.2.2. Visible Data Changes. *All* controlled engineering data or metadata*, including changes,* will be visible to any ACMS user who is authorized to see, use, or revise the data.
- 2.2.3. COTS Based. ACMS will be based on *maximum use of* COTS products. *There may be different COTS products at different sites.*

- 2.2.4.1. Single Access and Control Point. *Secure and control access to Army engineering data by providing* a single, common means of finding and accessing Army enterprise-level engineering data, *yet not inhibit authorized users (to include remote users) from locating and retrieving data quickly and easily*.

  <Note -- This language represents a merging of 2.2.4.1 and 2.2.4.4, as well as changing the notion of controlling data to controlling access to data.>

- 2.2.4.3. MIL-STD-2549 Data. No change was made to this goal, but it spawned extensive and contentious discussion. Consensus was not achieved on suitability of this as an ACMS goal. Refer to the issues described below.

- 2.2.4.4. Secure Data. This goal was combined with 2.2.4.1.

- 2.2.4.5. Manage Multiple Formats. No change was made. Some concern was expressed about needing to limit the number of formats supported. There seemed to be general agreement that ACMS should be able to handle any and all formats. It was suggested that the issue of formats supported may be tied to the resolution of the MIL-STD-2549 issue, since MIL-STD-2549 specifies metadata for different types of engineering data.

- 2.2.4.7. Manage Product Structures. Provide for establishing, storing, and controlling links (relationships) between elements of product structures (i.e., parts, components, and assemblies) *for which the Army is the Current Data Change Authority (CDCA).*

  <Note -- It was agreed that when the Army is the CDCA, ACMS will control changes to the product structure. When the Army is only an Application Authority, ACMS will not control product structure changes.>

  <Note -- It was agreed that control in this sense means making authorized changes and precluding unauthorized changes.>

  <Note -- The MIL-HNBK-61 definition of CDCA is Current Document Change Authority. It was expanded to Data in order to reflect the broader scope of what is to be managed by ACMS.>

- New Goal. *Contractor Controlled Product Structures. Provide the ability to find, copy, view, or print product structures when the Army is not the Current Data Change Authority (CDCA) (e.g,, contractor controlled product structures and data).*

- 2.2.4.8. Manage Data Representations. Provide for establishing, storing, and controlling the associations between product structures and the engineering data that represent (describe) the elements of product structures *for which the Army is the Current Data Change Authority (CDCA).*

- New Goal. *Contractor Controlled Data. Provide the ability to find, copy, view, and print the associations between product structures and the engineering data that represent (describe) the elements of product structures for which the Army is not the Current Data Change Authority (CDCA) (e.g,, contractor controlled associations).*

- 2.2.4.9. Manage Workflow. Provide for work process definition, routing, status tracking, and performance analyses *of the process modeled*.

- 2.2.5.1. Configuring Capabilities. System administrator-level tools for configuring ACMS to support information interchange within an Army site in accordance with each site's business processes and technical data needs, so long as the core information is provided for off-site users. These tools will permit configuring the system without needing to directly write source code or recompile unaffected software modules. *The tools will be available at two levels – System Administrator/site specific level and System Administrator/Army. These tools will permit configuring the system minimizing the need to directly write source code or recompile unaffected software modules.*

- 2.2.6. Standard Interfaces. ACMS will provide interfaces to *known* systems belonging to various user communities (e.g., MSC, government and industry information and process management systems).

  <Note -- Removed the word *standard* from before *interfaces*.>

- 2.2.7. Existing Infrastructures. ACMS will use existing Army communications and computing infrastructures.

  <Note -- Removed the words *whenever feasible and cost effective*.>

Issues:

- Glossary of Terms. The ACMS CONOPS (which includes the goal statements) needs to include a glossary of terms. Examples of terms that require definition include, but are not limited to the following: Federated system of systems, technical data, engineering data, enterprise-level engineering data, corporate engineering data, data control, product data, and data management system.

- Meaning of Controlled Data. The meaning of controlled data and what data ACMS actually controls needs to be explained and understood. It was agreed that ACMS would control and configuration manage data vaulted in ACMS and JEDMICS, but would only control Army access to and have visibility of data vaulted in contractor data management systems. Data vaulted in local instantiations of ACMS would be controlled and configuration managed by the local component of the federated ACMS. Visibility and access, but not control or configuration management, would be provided to the larger ACMS community.

- MIL-STD-2549 Data. The ACMS Task Force is decisively split on the idea of using MIL-STD-2549 as a basis for data interchange between systems. On group considers this a fatal flaw. They argue that the standard has not been tested, that weapon system PMs and contractors will not support it (i.e., they will not buy/provide MIL-STD-2549 data), and most Product Data Management (PDM) and Commercial-Off-The Shelf (COTS) products do not support MIL-STD-2549. The other group argues that a standard is necessary or the ACMS will not be able to exchange metadata internally or externally. It was asserted that while MIL-STD-2549 is an imposing document, once understood, it becomes a "cookie cutter" once one knows how it is used. Mr. Ney assigned himself the **action** to arrange for training on MIL-STD-2549 for the Task Force. The target date would be to coincide with the January requirements review meeting in Orlando, FL.

Day 2: Wednesday, 5 November 1997

Demonstration of Electronic Technical Data Package (ETDP)

Ms. Patricia Martinez demonstrated the TACOM-Warren Electronic Technical Data Package (ETDP) capability. The ETDP is an system designed to facilitate the creation of procurement packages.

The Commodity Command Standard System (CCSS) generates a Procurement Request Order Number (PRON) which is electronically sent to TACOM-TARDEC. Receipt of the PRON kicks off the review and packaging process supported by ETDP's workflow and electronic document distribution capabilities. TACOM uses TACOM's Intranet and ETDP to pass electronic procurement packages around for review and assembly. The electronic procurement package includes more than just a Technical Data Package List (TDPL) and images. It includes procurement documents such as Procurement Work Directive, Technical Data Package (TDP) Transmission Memo, Packaging, Quality Assurance, Ozone Depleting Chemicals List, specifications, and waivers to mention a few. Upon completion of the review and assembly of the procurement package, it is sent via ETDP to the TACOM-Warren Acquisition Center where the electronic version of the TDPL and images are extracted and loaded on to a Compact Disk (CD) for external distribution.

A significant feature of ETDP is the ability to hyperlink to TACOM's configuration management system to retrieve information about a drawing. ETDP consists of a collection of Government-Off-The Shelf (GOTS) and COTS

products. It is not only used to create and review procurement packages, but it also is used internally when developing responses to Defense Logistics Agency (DLA) and contractor requests for TDPLs and images.

Potential ACMS CONOPS Issues

Mr. Cox began a briefing to highlight possible issues the ACMS Task Force might have with the CONOPS. The intent was to ensure these topics were surfaced in the event that there was insufficient time to review the entire CONOPS. The group was able to cover only one issue before the next break. After the break, it was determined that time would be better spent stepping through the CONOPS itself, beginning with Section 4, ACMS Support of Weapon System and Data Life-Cycles.

The issue discussed was, "What data will be controlled by ACMS: ACMS vaulted data, JEDMICS data, and/or externally stored data in PDM, CM, Contractor Integrated Technical Information Services (CITIS), and authoring systems?" It was universally agreed that no externally stored data will (or can) be controlled by ACMS where controlled in this sense refers to change control and check-in and check-out control. It was noted that the CONOPS needs to make a clear distinction between change control and access control. ACMS should have visibility into all Army corporate engineering data, but ACMS will not be able to exercise change and check-in/out control of data stored external to ACMS. An exception appears to be JEDMICS. It appears that the Task Force is satisfied that ACMS shall provide the means for checking data into and out of JEDMICS for Army users, and that changes to Army owned data stored in JEDMICS should be processed through ACMS.

In general, there appeared to be agreement that there should be one and only one way to change any given piece of Army engineering data. However, that way could be different for each command with a different PDM system. All the data managed by a particular command's PDM system would be managed in a single manner, but the method another command chooses to use may be somewhat different. It was agreed that commands with Web-based access to their PDM systems should strive for a "common look and feel" for the outside user.

At this point, there was some discussion as to whether ACMS would even be based on a commercial PDM system. Although the topic was not raised by AMCOM, an AMCOM representative indicated that with funding, they could make their existing systems (to include TD/CMS) work. The AMCOM representative expressed concern as to whether a commercial PDM system will provide capability equal to and no less than what they currently have. Anything that is less than the current capability would be very difficult to sell at AMCOM.

A discussion ensued as to what alternatives existed to a commercial PDM system. Upgrading TD/CMS was one possibility. Another would be to take the CMIS 4.0, which almost met the Army needs, and revise and complete that software. It was asserted that any other solution would be very expensive. <Note -- The Army rejected CMIS 5.0 because it represented a radical departure from CMIS 4.0 and was further from meeting Army needs than CMIS 4.0.>

The notion of upgrading TD/CMIS or CMIS 4.0 surprised some members of the Task Force. It has long been a premise of the initiative that a COTS PDM system or systems would be central to ACMS. After considerable discussion, a consensus was achieved that ACMS would be based on commercial PDM system(s). At this point, break was called.

ECALS Demonstration

Ms. Lee Sadauskas of TACOM-ARDEC demonstrated their Engineering Changes at Light Speed (ECALS) capability. ECALS enables users to submit, process, and track ECPs, RFDs, and RFWs in accordance with MIL-STD-973 and MIL-STD-2549. It is a web-based application that can be accessed using Netscape or Internet Explorer.

ACMS CONOPS Review

Mr. Ney began the next session by establishing some ground rules. First, the concept of operations to be discussed is focused on long-term goals. Second, ACMS will be based on PDM system(s), or something very close to PDM

systems, with a set of core data that must be supported by local implementations. Third, the rest of the CONOPS discussion will involve a step by step review of the CONOPS beginning with Section 4, ACMS Support of Weapon System and Data Life-Cycles.

At least one member of the Task Force asserted that no agreement would be possible if ACMS were constrained to a single PDM system solution. Each command must be able to select its own PDM system.

It was not possible to review the entire ACMS CONOPS during this Status Meeting. BDM will review the entire document and revise it to reflect the following general themes that emerged from the discussions and any comments that are provided in writing.

1. ACMS components of the federation of systems will share metadata, so that all ACMS users will be afforded visibility into and access to data for which they are authorized. Change and check-in/out control of data will be provided and managed by the local component of ACMS that has physical storage of and management responsibility for the data.
2. Concepts that suggest ACMS will exercise control over data stored externally to ACMS will be removed. ACMS's interaction with external data management systems will be revised to indicate the requirement for interfaces (so that visibility into the data may be provided), but not for control. The exception to this will be Army-owned JEDMICS data and data stored in any other external repositories for which the Army is the Current Data Change Authority.
3. Engineering Change Proposal (ECP) will generally be replaced by change action or engineering change action unless the point being made is clearly intended to apply to ECPs alone.
4. References to forms will generally be replaced by display.
5. References to engineering data or engineering and technical data will be examined to see if the concept being portrayed would more appropriately be described using the term product data.
6. ACMS will provide established reports such as TDPLs, Generation Breakdown Lists (GBLs), and where-used reports. ACMS must also provide performance based reporting and the ability to produce process information.
7. ACMS will support saving queries and development of ad hoc queries.

Mr. Cox used the prepared CONOPS briefing to stimulate and attempt to focus discussions on specific paragraphs in Section 4. Each slide provided bulletized representation of the text in the CONOPS. The following paragraphs summarize discussions and/or particular changes that were directed by the Task Force. Specific additions are italicized.

4.1 ACMS Support of Weapon System Life-Cycle. No change was recommended, but an observation was made that the ACMS Task Force had limited representation from the sustainment, modification, and disposal communities.

4.1.1.2 Example Uses. The paragraph needs to recognize that storage of created data may occur via a contractor's data management system, not ACMS. It also was suggested that *engineering and technical data* be replaced with *product data* as a general rule in the CONOPS. For the most part, this suggestion can be applied to the use of *engineering data* as well, given the way in which it was used in the CONOPS. Definitions for these terms were also requested, and will be provided in a Glossary of Terms.

4.1.2 Manufacture. Add the following sentence to the end. *"ACMS will enable users to perform where-used (or co-used) analyses to ensure proper coordination of ECPs."* This addition is to be added to each of the weapon system life-cycle phases.

4.1.3 Operation. Revise the last sentence to read as follows: "ACMS also will enable a preparer of an *engineering change action* to determine if similar or related *engineering change actions* are in process, have been rejected, or have been approved.

4.1.4 Sustainment. Remove the sentences, "A field maintenance worker also could use ACMS's remote access capabilities via a web browser to initiate an ECP to initiate a correction to a problem only discovered in the field.

An example would be a design that makes it impossible to remove a component after item manufacture." It was decided that field maintenance workers may suggest engineering change actions, but they will not necessarily be submitting them to ACMS.

In place of the removed sentence, add the following: *"Using ACMS, the maintenance community will be able to record field maintenance actions."*

The next sentence also should be changed to begin as follows: "*Selected* logisticians and maintenance personnel ... ."

All instances of ECP in this paragraph are to be changed to *engineering change action*.

4.2.1.1 Overview. Revise the fifth sentence to read as follows: "The new data includes actual engineering data representations of products (e.g., drawings, models, *software*, and documents such as *requirements and specifications*), product structure representations, configuration control data, ECPs, mark-ups and redlines, relationships between data, relationships between data and product structure elements, and other data about the engineering data (metadata)."

4.2.1.2 Operational Concept. The sentence pertaining to MIL-STD-2549 was designated as a "parking lot" issue for later discussion.

4.2.1.2.2 Data Check-In. Revise the first two sentences to read as follows: "Checking data into the ACMS is *one* means by which engineering data is entered into the ACMS environment of managed data. Upon initiation of the check-in function, ACMS will present, *an authorized data author* with a form of required ACMS metadata."

Revise the next to last sentence as follows: "The user *may* not need to know the actual physical location of the data."

Add the following sentence to the end of this paragraph: "*ACMS will also support batch loading of data*."

4.2.1.2.3 Populating JEDMICS *and Other External Repositories*. Replace the first sentence with these two sentences: "*ACMS will be able to populate external repositories for which ACMS is the controller of Army engineering data. JEDMICS is one example of such a repository*."

Modify the next sentence as follows: "*One way in which* Army data owners or authors will populate JEDMICS with engineering data *is* by using ACMS check-in features.

Add the following sentence to the end of the paragraph: "*ACMS also will support batch loading of external repositories such as JEDMICS*."

4.2.1.2.5. Build Product Structures. Add the following as the last sentence: "*ACMS also will be able to import product structure relationships authored elsewhere*." The specific comment was actually made during the discussion of paragraph 4.2.1.1, but most appropriately belongs here.

4.2.1.2.6. Establish Relationships. Revise the first sentence to read as follows: "In addition to the product structure relationships described above, ACMS will be *an* authoring tool for defining the following kinds of relationship data: links between engineering data and product structure elements, links between two data items, and the type of links themselves."

Add to the end of the paragraph, the following to accommodate loading relationships authored elsewhere: "*ACMS also will be able to import relationship data authored elsewhere. This includes the following kinds of relationship data: links between engineering data and product structure elements, links between two data items, and the type of links themselves*."

The ability to specify the type of link is meant to provide a means of describing relationships between objects. For example, the relationship between a product structure element and a data item could be characterized as "is described by" or "is changed by" or "is an instruction for." The "is described by" relationship would represent traditional engineering data such as a model or drawing. The "is changed by" relationship would represent an ECP or RFD against a part. An "is an instruction for" relationship could represent a management directive related to a part.

Note that not all PDM systems support type of link relationship data. Many will simply have product structure relationships (parent to child relationships between product structure elements) and product structure element to data item relationships. **This may represent a discriminator. It is important for the Task Force to be certain it wants this specific capability**.

4.2.1.2.7 Create *Change Actions*. Replace "ECP" with "*change action"* and "form" with "*display"* wherever they appear in this paragraph.

A comment was made that this paragraph is an example of how the CONOPS is too detailed. It was suggested that all the CONOPS should say about change control is that, "ACMS will manage, associate, and track change documents against product data."

4.2.1.2.9 Web-Based Access. Revise this paragraph to read as follows: "Web-based access to the ACMS is relevant to the data acquisition life-cycle phase because data authors with access to a web browser will be able to use a browser to *create and* check data into ACMS using the browser and the Internet. *ACMS will provide a full-function Web client interface for users who access ACMS using a Web browser*."

4.2.1.2.10 Acquire Metadata. Replace "form" with display wherever it appears in this paragraph and revise the first sentence as follows: "Metadata *may* be acquired via ACMS from both data authors and external data management systems."

The capability to import MIL-STD-2549 data described in this paragraph is part of the MIL-STD-2549 parking lot issue.

4.2.2.2 Operational Concept. ACMS will provide access to data stored and controlled by local elements of ACMS, but non-local elements will not exercise change control or control check-in/out of locally stored data. To accommodate this concept in the CONOPS, revise the paragraph as follows:

> "*Within the Army's concept for engineering data management, ACMS will be the Army's corporate engineering data management system, providing visibility into all official engineering and technical data. ACMS also will provide configuration control of Army engineering data for which the Army is the Current Data Change Authority (CDCA). All components of ACMS will share access to Army engineering data. Local elements of the ACMS federation of systems, however, will exercise change and check-in/out control for data that they store and manage locally. This means that while the local component of ACMS will exercise physical control over the data, any ACMS user will be able to find and retrieve any data maintained within the ACMS federation. The notion of shared data access is further extended when ACMS exchanges metadata with external PDM, CM, or CITIS systems. This exchange will provide ACMS with visibility into what data is available and where it is located. As the Army's primary mechanism for accessing the data, ACMS will interact with the external systems to request the data be provided when needed. The following subparagraphs provide descriptions of specific ACMS operational capabilities that will support the management of Army engineering data*."

4.2.2.2.1 Store and Protect Data. Revise the last sentence of this paragraph to include the concept of ACMS as the single entry point into JEDMICS and external repositories. The revised sentence will reads as follows: "ACMS will protect Army data stored in JEDMICS *and other external repository* by serving as the Army's single entry point into JEDMICS for the purposes of both loading and retrieving data."

This was the last paragraph on which the Task Force explicitly provided comments during the meeting.

Status of JEDMICS Implementation

Each MSC reviewed its status on the implementation of JEDMICS and the termination of DSREDS. The following list identifies who briefed.

Organization	Presenter

Organization	Presenter
AMCOM (MICOM & ATCOM)	John Montgomery (EDMS PMO) Carla Crawford (AMCOM (P) RDEC)
CECOM	Gary Salomon (CECOM)
IOC	Will Ensenat (IOC)
RIA	John Bender (RIA)
TACOM - Warren	Patricia Martinez (TACOM-WRN)
TACOM - ARDEC	Carol Sitroon (TACOM-ARDEC)
PM JEDMICS	John Montgomery

AMCOM. Mr. John Montgomery, and Ms. Carla Crawford briefed the status of the AMCOM JEDMICS implementation. AMCOM now has JEDMICS at full production. One hundred forty thousand (140,000) aviation and missile images have been merged into a single AMCOM JEDMICS. Digital Storage and Retrieval Engineering Data System (DSREDS) has been dismantled. The AMCOM JEDMICS is supporting dual aviation and missile business processes, but the intent is to merge MICOM Integrated Configuration Management and Procurement Program (MICAPP) and Aviation TD/CMS in mid-December in order to support a single business process.

Several issues were cited during the briefing. They include the following:

- A lack of personnel arriving from ATCOM to handle the TDP workload.
- Excessive down-time due to maintenance on the automated document library (ADL) Juke Box.
- Output performance rates are not sufficient.
- A new law has established criminal liability for disclosure of limited rights data. The nature of the law may make it impossible to grant support contractors access to limited rights data. This can impact the commands' ability to perform their work.

Other issues were surfaced and can be reviewed in the attached briefing.

CECOM. Mr. Gary Salomon reported that none of the issues CECOM surfaced at the August 1997 meeting have been satisfactorily addressed by JEDMICS. He noted that CECOM turned DSREDS off in June 1997.

IOC. Mr. Will Ensenat indicated that problems identified at the August 1997 meeting still exist. He also reported that as a result of the Quadrennial Review, Tobyhanna Army Depot is transferred to CECOM as an experiment. Mr. Ensenat noted the following barriers to retrieving data from remote sites:

- The network is slow.
- Some MSCs are reluctant to permit depots to directly access their primary repository (may be a fee issue).
- There needs to be a way to provide massive amounts of data from the MSCs to the depots.

RIA. Mr. John Bender briefed the status of the RIA JEDMICS implementation. He reported that RIA's JEDMICS has been operational since 1 October 1995. Currently it serves 43 sites and has 1113 user profiles. Usage is increasing. From 1 October 1996 to 30 September 1997, they have logged 98,291 hours of usage. Mr. Bender also reported that CDEX was installed in September 1996 and, as of 30 September 1997, had produced 18, 481 CDs.

TACOM-Warren. Ms. Patricia Martinez reported that TACOM-Warren switched to JEDMICS from DSREDS. Maintenance for DSREDS ended 30 September 1997, but DSREDS is still occasionally used due to image and daemon problems with JEDMICS. JEDMICS continues to experience printing problems. TACOM-Warren has targeted the first week of December for disassembly of DSREDS.

TACOM-ARDEC. Ms. Carol Sitroon reported that TACOM-ARDEC has fully transitioned to JEDMICS. DSREDS has been shutdown and is scheduled for disassembly in January 1998. Security of JEDMICS is one of their concerns. TACOM-ARDEC is restricting access and requiring users sign a four page non-disclosure agreement. They also are having problems with synchronization with TD/CMS. About 500 JEDMICS images still need to be cleaned up.

DoD JEDMICS. Mr. John Montgomery presented an update on DoD JEDMICS and Army priorities relative to that program. He indicated that the current release is version 2.5.2. PC JEDMICS's current version is 2.3.

In an effort to improve the jukebox performance, they are developing a "multi-store" concept. A data call will be forth coming. A mid-December test bed evaluation is expected with a solution deployed by April 1998.

The Oracle component of JEDMICS is Year 2000 compliant. They are looking to resolve other Year 2000 problems with release 3.0 which is due in August 1998.

Mr. Montgomery indicated that the Army priority items for JEDMICS included the following:

- C4 image fix,
- Throughput performance improvements,
- Digital data upload server,
- Accompanying document management improvements,
- Single point of failure (jukebox),
- Reduced number of workarounds (SPRs are prioritized, but no schedule has been published),
- Limited/priority rights access control,
- Data platter backup processing (there are no funds for this), and
- Deployment of data transmission protection software release.

Ms. Martinez requested a copy of the JEDMICS site maintenance plan and contract wording, for TACOM-Warren.

Day 3: Thursday Morning, 6 November 1997

Summary of Next Steps

Mr. Ney began the last day with a discussion of next steps and mechanisms the Task Force can use to communicate outside of status meetings. He indicated that written comments against the technical data management business problems and CONOPS will be accepted from the Task Force members. November 11th was specified as the due date for those comments. BDM will revise the two documents and Mr. Ney will post them on the ACMS web site. It was noted that the ACMS core data issue may not be resolved and included in the next publication of the CONOPS.

Mr. Ney then discussed the need to reschedule the next meeting. Based on the difficulties encountered at this meeting, it became clear that proposed ACMS requirements will have to be distributed sufficiently far in advance that the commands can submit written comments. Approximately 200 to 300 draft requirements are expected. Upon receipt of the comments, BDM will assemble them for the next meeting where the discussion will focus on items for which comments were received. To accomplish this the schedule must slip as was described earlier in these minutes (refer to the note augmenting the first day's introductory session).

Mr. Ney reminded the Task Force members of several communication and coordination tools that are available for this group. He offered the chat group on the EDMS FCG web page as a means to carry-on a running dialogue with multiple people. When an issue is posted, the entire membership should be notified and offered the opportunity to add to the dialogue. Mr. Ney indicated that three mail reflectors were available to the group for notifying

everyone. Mr. Ney will update the addresses and provide a list of all parties included in each of the reflectors. The following are the reflector addresses:

- Primary EDMS FCG members: fcg-pri@www2-iea.ria.army.mil ,
- Alternate EDMS FCG members: fcg-alt@www2-iea.ria.army.mil , and
- Special EDMS FCG members: fcg-special@www2-iea.ria.army.mil .

Mr. Ney also posted the EDMS FCG homepage address: www-iea.ria.army.mil/ai/eng_data/ . He also indicated he will try to combine the MIL-STD-2549 training with the next Task Force meeting in Orlando.

ACMS Data Call

Mr. Ed Dorchak of presented a discussion of the status and objectives of the ACMS Data Call which had been distributed in late September. Mr. Dorchak stated that two responses had been received to date and that responses were expected no later than 14 November.

Mr. Dorchak provided clarification on the purpose and content of the data call. He indicated that its purpose was to develop requirements in each of the topic areas which would represent minimum capabilities which the ACMS would be expected to provide. He requested that responses to the data call be made with this in mind and stated that the responses would become the basis for requirements which will appear in the performance specification.

In particular, Mr. Dorchak indicated that client hardware/software responses should represent the client hardware and software that the Army requires ACMS to run on. The same is true for the server hardware/software, if the expectation is that ACMS will operate using a client-server configuration. Site connectivity questions should respond to the need for users at remote sites to use ACMS and should account for number of users and number of simultaneous users. Applications refers to software which ACMS should integrate or interface with, most likely data authoring and viewing systems. Security provided a list of candidate security requirements for comment. Support and ownership asked for requirements in the areas of training, maintenance, and operator skill level. Finally, performance asked for requirements associated with system response, accuracy, and any other feature related to how well ACMS executes its functions. In the area of performance requirements, it was suggested that requirements could be levied on ACMS as a self-contained, standalone environment to preclude having to account for effects outside of ACMS vendors' control such as network performance.

Mr. Dorchak discussed the intent in requesting replaced systems by stating that what he was after was any requirements which the Army wanted ACMS to provide which were the result of a system being replaced by ACMS. He stated that the emphasis should be on the requirement, not the system replaced. He also stated that if the requirement were a standard PDM requirement, it did not have to be mentioned since it probably would be included in the performance specification from the PDM Capabilities Framework. Nevertheless, responders are requested to provide whatever requirements they feel are appropriate in this area. This discussion supersedes the specific words on the slide since the words on the slide caused some confusion as to their intended meaning to several of the FCG members.

In discussing subsumed systems, the JEDMICS example was discussed. The point was made that JEDMICS will maintain some form of independent identity no matter what the Army decides to do. However, no decision has been made at this point whether JEDMICS will interface with ACMS or if JEDMICS data will simply be absorbed into ACMS. It was pointed out that no money has been programmed for JEDMICS maintenance in FY99 and later and this may be a motivation for migrating Army JEDMICS data into ACMS, since it would represent a savings on the large recurring bill which is needed to maintain JEDMICS.

Mr. Dorchak discussed the distinction between integrated and interfacing systems, particularly as it pertains to authoring applications, to ensure clarity in the responses given. Finally, Mr. Dorchak discussed specific responses on interfaces received to date. In particular, it was determined that CBDCOM intended to import CAD files into its PDM systems rather than have them be stored in the native authoring system. The JEDMICS questions were deferred. Mr. Dorchak mentioned that any interface requirements had to be tied to specific systems, not to generic classes, such as "developmental contractor systems".

Additional slides showing responses to date were not presented by Mr. Dorchak but appear in the attachments to these minutes.

ACMS Performance Specification Discussion

Mr. Cox of BDM provided a short briefing on the ACMS Performance Specification. He indicated that the performance specification will contain two types of requirements: filtering requirements and Army unique requirements. The filtering requirements will be used to filter or weed out systems that do not do both PDM and configuration management well. The *ACMS Requirements Based on Common PDM System Characteristics* (sent out to the Task Force earlier) represented BDM's cut at the PDM filtering requirements. Mr. Cox requested feedback on the content and level of detail of those requirements. BDM is developing configuration management filtering requirements based on MIL-HDBK-61 and MIL-STD-2549. Both sets of requirements will be distributed by 26 November and reviewed at the next Task Force meeting.

Mr. Cox also indicated that Army unique requirements need to be identified. The responses to the data call will be used to develop some of those requirements. BDM also is reviewing CMIS requirements as a source for possible Army unique requirements. The CMIS requirements also will be used to cross check the configuration management filtering requirements BDM is developing. Note that BDM is attempting to eliminate CMIS requirements that apply only to other services or are implementation specific.

Ms. Martinez noted that the ACMS Performance Specification must contain Continutity of Operations (COOP) requirements. It was suggested that COOP was an ARMY unique requirement and Ms. Martinez was asked to draft the requirement.

Parking Lot Issues

Mr. Ney lead a discussion of parking lot issues. Two issues were scheduled for discussion:

1. ACMS Core Data: MIL-STD-2549 or Something Else.
2. Standard File Format and Doc type Codes.

Prior to addressing the parking lot issues, there was considerable discussion on how circumstances relative to ACMS have changed. It was observed that there is less support from senior leadership for a standard system than when the Task Force began in May. Originally, MG Beauchamp had tasked the group to define the requirements for a standard system that would be implemented by the EDMS PM. Now the leadership has changed and there is less support for a standard system, the commands want to implement their own solutions, and AMC may not provide central funding.

Given these circumstances, the ACMS Task Force seemed to be suggesting that implementation be accomplished by each site with the EDMS PM functioning as a facilitator, coordinator, and monitor of individual MSC implementations of ACMS. The EDMS PM would basically perform audits of those implementations and validate that the MSC implementations conform to the collective ACMS requirements.

The ACMS Task Force also recommended that it be given responsibility for developing a funding plan to solicit centralized funding from AMC. Mr. Ney noted that this had been in the Task Force's original Plan of Action, but had been removed by the leadership. The Task Force voted to recommend it be given this responsibility back.

This pre-parking lot discussion concluded with a discussion about ACMS's primary function. There seemed to be agreement that ACMS would be first and foremost a replacement for TD/CMS. ACMS's second main responsibility would be to support the Tech Loop process. After these two areas, ACMS is intended to provide Army-wide interoperability and support the Army's role in CITIS relationships. The discussion then lead into the ACMS core data parking lot issue.

<u>ACMS Core Data: MIL-STD-2549 or Something Else</u>.

As mentioned earlier, ACMS Task Force representatives disagreed on what constitutes common core data for ACMS. One group favors a minimal, but undefined set of data elements. The other believes MIL-STD-2549 defines what should be the core data elements.

It was asserted that MIL-STD-2549 is a specification for interfaces and data exchange. Industry and the DoD worked on it together for many years to determine what data needed to be exchanged to adequately support configuration management of weapon systems. MIL-STD-2549 does not require any system to maintain the data in any specific way (i.e., it is not a data model for a system's internal database).

On the other hand, MIL-STD-2549 is a new standard that has not been implemented and tested. There is risk associated with the Army being the guinea pig. It also was asserted that some implementations of the existing TD/CMS only use about 25 data elements, whereas MIL-STD-2549 defines many hundreds.

The discussion that ensued indicated that the issue needed to be broken into two types of interfaces: one for contractors and the other for government entities. It also was suggested that the way to resolve the deadlock was to identify the functions that require interfaces, examine the data that must be exchanged to support those functions, and then determine how best to accomplish the exchange.

A work group was formed to explore this issue. Membership in the work group is to include representatives from the following organizations: AMSAA, CECOM, AMCOM, TACOM-Warren, TACOM-ARDEC, SSCOM, and CBDCOM. Ms. Gayle Booker was asked to participate in the work group as well. The objective of the work group is to reach resolution on the issue of core ACMS data and to return to the Task Force with the results.

Standard File Format and Doctype Codes. It was suggested that a standard set of codes needed to be established for specifying file formats and document types. The Task Force determined that this issue was a subset of the core data issue.

CONOPS Wrap Up

Mr. Ney began this session by asking that written comments on the ACMS CONOPS be sent to Mr. Cox at jcox@bdm.com by 11 November. Mr. Ney then lead a brief open floor discussion of the CONOPS. The following comments were provided prior to closing the meeting:

1. The CONOPS lacks much discussion on the ability to generate certain standard reports, site unique reports, and ad hoc reports. Examples of standard reports include TDPL, GBL, and monthly, weekly, performance reports.
2. The CONOPS is too detailed and had too many how to points. Many of the details belong in the performance specification not the CONOPS. It was noted that one reason for the detail was to help identify specific requirements.

As mentioned earlier, the Task Force members were asked to provide written comments by 11 November.

The issue of metrics and how they would be developed was raised again. It was asserted that metrics are an important factor in performing economic analyses, developing an implementation plan, and obtaining funding for ACMS. Developing site unique systems will make metrics design harder.

Mr. Ney then closed the meeting.

Action items from this meeting:

ITEM DESCRIPTION	RESPONSIBLE INDIVIDUAL	COMPLETION DATE
Resolve issue of common core data requirements : MIL-STD-2549 vs. data both more than and less than all of MIL-STD-2549	Representatives from the TD/CMS sites (CECOM, AMCOM, TACOM-Warren, TACOM-ARDEC, SSCOM, and CBDCOM)	Before meeting on draft requirements in Jan 98
Arrange MIL-STD-2549 Training for the ACMS Task Force.	Gordon Ney	Will try to schedule for meeting in Jan 98
Provide Ms. Martinez a copy of the JEDMICS site maintenance plan and contract wording.	John Montgomery	within 30 days by 6 Dec 97
Written comments concerning the technical data management business problems and ACMS CONOPS.	ACMS Task Force members	11 November 1997
Revise the proposed problem statements based on comments received.	BDM	1 Jan 98
Revised business problems and ACMS CONOPS published on the ACMS web site.	BDM & Gordon Ney	1 Jan 98
Respond to initial ACMS data call.	ACMS Task Force	14 November 1997
Send out draft ACMS requirements.	BDM and Gordon Ney	26 November 1997
Provide comments on draft ACMS requirements.	ACMS Task Force	15 December 1997
Post comments on draft ACMS requirements on ACMS Task Force web site.	Gordon Ney	Shortly after 15 December 1997
Attend ACMS requirements review meeting.	ACMS Task Force	Week of 12 January 1998
Send out draft Performance Specification.	BDM and Gordon Ney	30 January 1998
Provide comments on draft Performance Specification	ACMS Task Force	13 February 1998
Attend ACMS Performance Specification review meeting.	ACMS Task Force	24 - 26 February 1998
Deliver final ACMS Performance Specification.	BDM and Gordon Ney	13 March 1998
Update the mail reflector addresses and provide a list of all parties included in each of the reflectors.	Gordon Ney	Before minutes of meeting are published
Draft a requirement for an Army Continuity of Operations Plan (COOP) for ACMS.	Patricia Martinez	14 November 97

Date, Time, Location and Purpose of Next ACMS Task Force Meeting

DATE: Week of 12 January 1998.

DURATION: 3 to 5 days depending on whether MIL-STD-2549 training will be provided.

LOCATION: STRICOM, Orlando, FL.

PURPOSE OF MEETING: Review candidate ACMS performance specification requirements and possibly receive MIL-STD-2549 training.

Appendix A
Attendees List

ACMS Meeting Attendees, 4-6 Nov 97

name	organization	off symbol	e-mail	phone (com)	phone (dsn)	fax (com)	fax (dsn)
Baren, Mr. Dave	TYAD, Tobyhanna, PA	SIOTY-LC	dbaren@tobyhanna-emh3.army.mil	(717) 895-6355	795-6355	(717) 895-8355	795-8355
Bender, Mr. John	RIA, Rock Island, IL	SIORI-IMO-D	jbender@ria-emh2.army.mil	(309) 782-4277	793-4277	(309) 782-7788	793-7788
Berels, Ms Cheryl	TACOM, Warren, MI	AMSTA-AQ-D	berelsc@cc.tacom.army.mil	(810) 574-7031	786-7031	(810) 574-7552	786-7552
Bickley, Ms Cathy	MEA, Redstone Arsenal, AL	AMXME-M	cbickley@redstone.army.mil	(205) 876-1158	746-1158	(205) 876-9062	746-9062
Booker, Ms Gayle	PM EDMS, Redstone Arsenal, AL	AMSAM-CIC-ED-P	gayles@redstone.army.mil	(205) 876-8277	788-8277	(205) 842-7360	788-7360
Campbell, Mr. Willie	LAISO, Redstone Arsenal, AL	AMSAM-AIS	campbell-we@ccsmtp.redstone.army.mil	(205) 955-7184	645-7184	(205) 955-8873	
Cantrell, Mr. Michael	CBDCOM, Aberdeen Proving Ground, MD	SCBRD-ENE-M	mrcantre@cbdcom.apgea.army.mil	(410) 671-5587	584-5587	(410) 671-3884	584-3884
Carlisle, Ms Cindy	AMCOM, Redstone Arsenal, AL	AMSAM	carlisle-cj@exchange1.redstone.army.mil		788-0867		
Corrie, Mr. Mark	TACOM, Warren, MI	AMSTA	corriem@cc.tacom.army.mil	(810) 574-8775	786-8775		
Craff, Mr. Alberto	TACOM, Rock Island, IL	AMSTA-AC-AP	acraff@ria-emh2.army.mil	(309) 782-4115	793-4115	(309) 782-4990	793-4990
Crawford, Ms Carla	AMCOM, Redstone Arsenal, AL	AMSAM-RD-SE-TD-	carlac@repos.redstone.army.mil	(205) 842-9821	788-9821	(205) 842-6119	788-6119
Edwards, Mr. Andy	GRIZZLY, Warren, MI	SFAE-GCSS-CM	edwardsa@cc.tacom.army.mil		786-7467		
Ensenat, Mr. Wil	IOC, Rock Island, IL	AMSIO-SME-A	wensenat@ria-emh2.army.mil	(309) 782-5175	793-5175		
Goodwin, Mr. Charlie	STRICOM, Orlando, FL	AMSTI-EO	goodwinc@stricom.army.mil	(407) 384-3916	970-3916	(407) 384-3888	
Kachmarsky, Mr. James J.	TYAD, Tobyhanna, PA	SIOTY-ME-E	jkachmar@tobyhanna-emh3.army.mil	(717) 895-6487	795-6487		
Kucyk, Mr. Doug	GSI, Warren, MI	SFAE-GCSS-GSI			786-7797		
Martinez, Ms Patricia	TACOM, Warren, MI	AMSTA-TR-E/EDI	martinep@cc.tacom.army.mil	(810) 574-6067	786-6067	(810) 574-5666	786-5666
McGlone, Mr. Steven	PM FCIM, Rock Island, IL	AMXSY-T	smcglo@ria-emh2.army.mil	(309) 782-6521	793-6521	(309) 782-7170	793-7170
Meinhart, Mr. Robert	TACOM, Watervliet Arsenal, NY	AMSTA-AR-CCB-EC	meinhart@pica.army.mil	(518) 266-4102	974-4102	(518) 266-3624	974-3624
Minniti, Ms Ann	CECOM, Ft. Monmouth, NJ	AMSEL-LC-LEO	minniti@doim6.monmouth.army.mil	(908) 724-3645	992-3645	(908) 532-1556	992-1556
Montgomery, Mr. John	PM EDMS, Redstone Arsenal, AL	AMSAM-CIC-ED-P	monty@redstone-emh2.army.mil	(205) 876-9842	746-9842	(205) 842-7360	788-7360
Murter, Ms Lisa	TECOM, Aberdeen Proving Ground, MD	AMSTE	emurter@atc.army.mil		298-9484		
Ney, Mr. Gordon	AMSAA, Rock Island, IL	AMXSY-T	gney@ria-emh2.army.mil	(309) 782-6586	793-6586	(309) 782-7170	793-7170
Pepper, Mr. John	AMCOM, Redstone Arsenal, AL	AMSAM-RD-SE-TD	jpepper@redstone.army.mil	(205) 876-5003	746-5003	(205) 842-6119	746-6119

Rice, Mr. Kenneth	SSCOM, Natick, MA	AMSSC	krice@natick-amed02.army.mil	(508) 233-4271	256-4271	(508) 233-5086	256-5086
Rickenbaugh, Mr. James	PM EDMS, Redstone Arsenal, AL	AMSAM-CIC-ED-P-I-M	rickenbaugh-jw@fhssmtp.redstone.army.mil	(314) 274-4792			
Sadauskas, Ms Lee	TACOM, Picatinny Arsenal, NJ	AMSTA-AR-EDE-S	lees@pica.army.mil	(201) 724-6626	880-6626	(201) 724-6702	880-6702
Salomon, Mr. Gary	CECOM, Ft. Monmouth, NJ	AMSEL	salomon@doim6.monmouth.army.mil	(908) 532-2224	992-2224	(908) 532-1413	992-1413
Schneider, Mr. Tom	AMSAA, Rock Island, IL	AMXSY-T	tschne@ria-emh2.army.mil	(309) 782-7794	793-7794	(309) 782-7170	793-7170
Sitroon, Ms Carol	TACOM, Picatinny Arsenal, NJ	AMSTA-AR-EDE-A	csitroon@pica.army.mil	(201) 724-6546	880-6546	(201) 724-5288	880-5288
Smith, Mr. Donald	RRAD, Texarkana, TX	SIORR	dlsmith@redriverad-emh1.army.mil	(903) 334-3823	829-3823	(903) 334-4311	829-4311
Stauffenberg, LTC Hank	TACOM, Warren, MI	AMSTA-CIO	stauffeh@cc.tacom.army.mil	(810) 574-6393	786-6393	(810) 576-7039	786-7039
Wheeler, Mr. John	AMSAA, Rock Island, IL	AMXSY-T	jwheel@ria-emh2.army.mil	(309) 782-4619	793-4619	(309) 782-7170	793-7170
Winfield, Ms Mary Jo	TACOM, Warren, MI	AMSTA-TR-E/EDI	winfielm@cc.tacom.army.mil	(810) 574-5279	786-5279	(810) 574-5666	786-5666
Yablonicky, Mr. Tony	SSCOM, Natick, MA	AMSSC	ayabloni@natick-emh2.army.mil	(508) 233-4883	256-4883	(508) 233-4716	256-4716
Williamsom, Debbie	AMCOM (SRS)			(205) 313-0218			
Dollberg, Bridget	AMCOM (VSE)			(973) 770-9000			
Cox, Jim	BDM			(703) 848-6739			
Dorchak, Ed	BDM			(703) 848-5740			

Appendix B
Briefing Charts

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Appendix C
ACMS Concept of Operations

DRAFT
Automated Configuration Management System (ACMS)
Concept of Operations (CONOPS)

1. Introduction

1.1 Purpose

1.1.1 Purpose of ACMS. The purpose of the Army's Automated Configuration Management System (ACMS) is to provide the Army with a next generation engineering data management system. ACMS will enable greater access to and sharing of corporate engineering data in support of Integrated Product Teams (IPTs), reprocurement activities, engineering change processing, operations and maintenance activities, and disposal activities. The primary enhancements ACMS will provide include the following:

1.1.1.1 *Storage and Use*. Extension of the types of data stored and managed (e.g., engineering models, simulations, and other forms of intelligent engineering data).

1.1.1.2 *Rapid Retrieval*. Enhanced ability to rapidly find, retrieve, and control access to engineering data.

1.1.1.3 *Process Automation*. Automation of standard processes such as baseline and release approvals, engineering change processing, Technical Data Package (TDP) validation, and IPT support.

1.1.2 Purpose of ACMS CONOPS. The ACMS concept of operations (CONOPS) has three primary purposes. First, it is intended to translate the ACMS vision into operational terms that guide development of ACMS performance requirements . Second, the ACMS CONOPS provides developers and users with an understanding of the operational context of those requirements. The third purpose of the ACMS CONOPS is to serve as a consensus building tool among the Army Major Subordinate Commands (MSCs) as to what kinds of capabilities ACMS will have, what functions it will support, and how ACMS will be used.

1.2 Scope

1.2.1 Scope of ACMS. ACMS will be the Army's enterprise engineering data manager. The combined capabilities of ACMS will support traditional configuration management functions, management of product structures, management of engineering data and associated technical data, engineering change proposal processing, the Army's Tech Loop functions, and interfaces with legacy repository systems (notably the Joint Engineering Data Management Information and Control System (JEDMICS)), the Army's Standard Procurement System (SPS), and Contractor Integrated Technical Information Systems (CITIS). ACMS will enable managing the Army's engineering and technical data throughout the life-cycle of a system -- from program development, through production, sustainment, modification, and ultimately disposal.

1.2.2 Scope of ACMS CONOPS. The ACMS CONOPS provides an overview of the operational uses for ACMS based on guidance expressed in the Army's ACMS vision and specific goals (both restated in the following section). Specifically, ACMS will operate as a corporate data manager and provider, an interfacing mechanism both externally and within the ACMS federation of systems, and a process enabler. The ACMS CONOPS also includes descriptions of ACMS operations in support of selected business processes.

2. ACMS Vision and Goals

2.1 ACMS Vision

2.1.1 Provide Required Data. ACMS will provide the required data **when it is needed** and **in a form that**

the user can apply to accomplish the mission.

2.1.2 Required Data Contents. Required data consists of **all the engineering data necessary to completely define an item** for the intended purposes of specifying, designing, analyzing, manufacturing, maintaining, sustaining, testing, inspecting, and dispositioning that item **over its entire life span**.

2.1.3 Flexible Data Management Environment. ACMS must operate in a **diverse Army environment**, **integrate** with other MSC business processes, and **communicate** with other MSC, government and industry information management systems.

2.2 Specific ACMS Goals

2.2.1 System of Systems. ACMS will be a system of systems that is scaleable and leverages the capabilities of existing government systems where feasible, cost effective, and necessary.

2.2.2 Visible Data Changes. Any changes made to controlled engineering data or metadata that are caused or enacted by a system within ACMS will be visible to any ACMS user who is authorized to see, use, or revise the data.

2.2.3 COTS Based. ACMS will be based on COTS products.

2.2.4 Core Data and Capabilities. ACMS will provide a core set of standard, Army-wide data and capabilities. Specifically, ACMS will:

2.2.4.1 *Single Access and Control Point*. Provide a single, common means of finding, accessing, and controlling Army enterprise-level engineering data.

2.2.4.2 *Sharing of Data*. Provide for concurrent, enterprise-wide access to and sharing of engineering data in a distributed, collaborative manner (both the data and the users may be geographically dispersed).

2.2.4.3 *MIL-STD-2549 Data*. Produce and read MIL-STD-2549 data packets as a means for exchanging relationship and configuration management metadata with internal and external Product Data Management (PDM), Configuration Management (CM), authoring, Contractor Integrated Technical Information Service (CITIS), and repository systems.

2.2.4.4 *Secure Data*. Control and secure Army engineering data, yet not inhibit authorized users (to include remote users) from locating and retrieving needed data quickly and easily.

2.2.4.5 *Manage Multiple Formats*. Provide for the management of a wide variety of engineering data formats, so that contractor created data is available, usable, and no data intelligence is lost.

2.2.4.6 *Automate Engineering Data Management*. Automate Army data management functions to include data capture, storage, location, retrieval, access control, and transmittal, as well as configuration management of data, quality control of data, and system administration.

2.2.4.7 *Manage Product Structures*. Provide for establishing, storing, and controlling links (relationships) between elements of product structures (i.e., parts, components, and assemblies).

2.2.4.8 *Manage Data Representations*. Provide for establishing, storing, and controlling the associations between product structures and the engineering data that represent (describe) the elements of product structures.

2.2.4.9 *Manage Workflow*. Provide for work process definition, routing, status tracking, and performance analyses.

2.2.5 Tailorable. ACMS will be flexible and customizable in its ability to interact with other data management systems and meet the unique information needs of individual MSCs. Specifically, ACMS will provide:

2.2.5.1 *Configuring Capabilities*. System administrator-level tools for configuring ACMS to support information interchange within an Army site in accordance with each site's business processes and technical data needs, so long as the core information is provided for off-site users. These tools will permit configuring the system without needing to directly write source code or recompile unaffected software modules.

2.2.5.2 *Customization and Integration Capabilities*. Provide customization and integration tools for tailoring ACMS to extend existing functionality, add new functions, provide new methods for interacting with users, and interface with other data management systems, data authoring systems, and viewing systems.

2.2.6 Standard Interfaces. ACMS will provide standard interfaces to systems belonging to various user communities (e.g., MSC, government and industry information and process management systems). For example, this includes COTS, government standard, and command-unique workflow and technical data management systems such as the following:

2.2.6.1 Mission Applications,

2.2.6.2 Workflow Management Systems,

2.2.6.3 Configuration Management Systems,

2.2.6.4 Repository Systems,

2.2.6.5 Data Authoring Systems and their Internal Data Management Features,

2.2.6.6 Product Data Management (PDM) Systems, and

2.2.6.7 Contractor Integrated Technical Information Service (CITIS) systems.

2.2.7 Existing Infrastructures. ACMS will use existing Army communications and computing infrastructures whenever feasible and cost effective.

3. Overview of ACMS Concept

3.1 ACMS as a System of Systems

3.1.1 Federated System of Systems. ACMS is to be the principal Army system for finding, retrieving, managing, and controlling access to Army engineering and technical data. It will be a federated system of systems in the sense that all sites will share standard data and possess capabilities that are common to the whole of ACMS, while retaining the right and ability to establish site unique capabilities and data. Within the ACMS federation, any authorized user will have visibility into ACMS controlled product structures, associated engineering and technical data, and standard ACMS metadata which identifies and characterizes the engineering and technical data.

3.1.2 Corporate-Level Visibility. ACMS will be fielded into an environment where many data

management, repository, and workflow systems already exist. As such, the ACMS concept must embrace all of these related systems by interfacing with them, subsuming them, or replacing them. In some cases, ACMS will be the only data manager, product structure manager, process manager, or repository for a set of engineering and technical data. In other cases, actual storage and direct control of the data and product structure will be performed by another data management system which must interface with ACMS. In all cases, however, ACMS must be afforded visibility into Army engineering and technical data in terms of its identity, status, and form. Likewise, it must be possible for authorized users to locate and retrieve any formally controlled, digital Army engineering and technical data via ACMS.

3.1.3 Minimum Core Metadata. MIL-STD-2549, *Department of Defense Interface Standard, Configuration Management Data Interface*, defines the minimum core metadata which must be sharable within and outside the ACMS federation. The data elements describe the configuration management data needed to support the principles of configuration management specified in EIA/IS-649, *National Consensus Standard for Configuration Management*. These data elements and the relationships depicted in MIL-STD-2549 also provided the basis for exchanging rudimentary product structure information in the form of parts list and Bill of Materials (BOM) data.

3.2 Specific ACMS Roles

3.2.1 Army Engineering Data Manager

3.2.1.1 *Corporate Engineering Data Manager*. ACMS is intended to be the Army's corporate or enterprise engineering data manager. To accomplish this, ACMS will need visibility into all engineering and technical data that is formally controlled and digitally stored. As a result, systems within the ACMS federation will need to exchange metadata about this engineering and technical data. This is necessary so that the data, a corporate resource, can be widely shared. ACMS will enable authorized users to create, find, manage, retrieve, view, redline, update as a new version, save as new data, or make some other use of any piece of controlled, digitally stored Army engineering and technical data. ACMS must be able to configuration manage this data regardless of which digital data repository physically stores the data (contractor or government) or which data management system exercises direct control over the data.

3.2.1.2 *Single, Comprehensive Engineering Data Manager*. In some instances, ACMS will function as the sole data manager and repository for a collection of engineering and technical data. This includes directly providing for the physical storage and configuration management of the data, as well as the security for and controlled access to the data. The security and controlled access will include managing user authorizations, monitoring access, and providing for the check-in and check-out of data. In these cases, ACMS will be the only data manager for the data.

3.2.1.3 *Shared Engineering Data Manager*. In other instances, ACMS will share data management responsibilities with other systems. Examples of other systems include unique Product Data Management (PDM), Configuration Management (CM), and CITIS systems owned and operated by individual programs, commands, or contractors. Data management features inherent in data authoring systems are another example of cases where ACMS will need to share data management responsibilities. Under these circumstances, physical storage, configuration management, security, and access control of the data will be accomplished by a system other than ACMS. ACMS and the other data management system, however, will interface to exchange metadata (see the Minimum Core Data discussion above), so that ACMS can maintain corporate level visibility of Army engineering data.

3.2.1.4 *Engineering Repository Manager*. For Army engineering data contained in or destined for JEDMICS, ACMS will be the Army entry point for both retrieving and loading the engineering data itself and related file index data (a subset of ACMS metadata). This concept of operation ensures that ACMS and JEDMICS data remain synchronized. ACMS will also provide for the configuration management of

this data.

3.2.2 Army-Wide Engineering Data Provider. With ACMS, it will be possible for any authorized user to identify and request any piece of digitally stored and controlled Army engineering and technical data. ACMS will assist the user in identifying the desired data, locate and request the data for the user, and then present the data to the user in a usable form. The following are key implications that result from this role:

3.2.2.1 *Visibility*. As the corporate engineering data manager for the Army, ACMS will have visibility into the identity and location of all formally controlled engineering data, regardless of whether it is owned by the Army (see 3.2.2.2) or another organization (see 3.2.2.3).

3.2.2.2 *ACMS Federation's Principal Entry Point*. ACMS will be the Army's principal entry point into the Army's federated engineering data management system. This means that Army data users will access and check-out Army owned and controlled engineering data via ACMS. It also means that Army data creators will use ACMS as the principal mechanism for placing Army engineering data under formal data management control (i.e., checking in data).

3.2.2.3 *ACMS User's Entry to External Data Management Systems*. When ACMS does not have direct physical control of desired data (vaulted elsewhere), ACMS will formulate a request for the data, submit the request to the controlling system, receive the requested data or response notice, and make the result (requested data or response notice) available to the user. As a result, Army data users will be able to check-out Army engineering data via ACMS even when ACMS does not directly manage the data.

3.2.2.4 *Product Centric Data Management*. ACMS represents a shift in the Army from document centric data management to product centric data management. This change will enable users to identify desired data by navigating product structures, searching for and through part families, as well as traditional approaches to finding data via search queries on data classification attributes. Product centric data management also means that the product structure is a controlled item in addition to (or in place of) documents describing the product structure (e.g., Bill of Materials).

3.2.2.5 *Web-Based Access*. ACMS will include the ability to access ACMS controlled data via commercially available Web browsers. Users of the ACMS will be able to login to ACMS via the browser, find desired data via search queries or product structure navigation, request (check-out) and receive data for viewing or copying (as new data), and mark-up or redline viewable images.

3.2.3 Interface Provider. ACMS will be fielded into a diverse environment of legacy engineering data management systems, repository systems, authoring systems, and mission applications that need to interact with ACMS. Furthermore, as a federated system of systems, ACMS itself will need to exchange data among several site unique implementations of ACMS. As a result, the ACMS architecture will need to be open and embrace a standards oriented approach to interfacing with other systems. Specifically, the ACMS will need to have a published Application Program Interface (API). It also will need to migrate towards the configuration management data interface standard (MIL-STD-2549) as the means for defining what metadata must be exchanged among ACMS and other PDM and CM systems.

3.2.4 Army-Wide Product Structure Manager. Product structure management is a new concept for Army-wide engineering and technical data management. It signifies a move away from document centric data management philosophy to product or part centric engineering data management. ACMS will have visibility into and configuration control of the product structure of any item for which controlled, digital engineering data is maintained. Associated with the product structure, ACMS will have visibility into the identity and location of all controlled, digital data that represents the elements of product structure. Thus, users of Army controlled engineering data may find the data by navigating the relevant product structure.

Additionally, ACMS will support displaying multiple views of the product structure. For example, ACMS can present design views of the data which would show the design data associated with the product structure. Another view would be a manufacturing view. In this view, some design information would be presented, but manufacturing process descriptions and simulations also might be included. Other views are possible as well.

3.2.5 Process Enabler. ACMS is intended to be a significant enabler of various Army business processes by making engineering data widely accessible and providing workflow tools that facilitate the distribution of tasks and data, as well as the monitoring and management of the processes modeled by the workflows. Specifically, ACMS will improve the efficiency of Army IPTs, Engineering Change Proposal (ECP) processing, and reprocurement Tech Loop activities by making it much easier to find and retrieve needed engineering and technical data; by providing tools that enable users to view, mark-up, or comment on data; by allowing concurrent access to data; by distributing tasks, electronic forms, and notices of assigned tasks and data availability via pre-defined and ad hoc workflows; by supporting electronic sign-off on data or tasks; and by dynamically adjusting access as user roles change with the receipt of specific tasks.

4. ACMS Support of Weapon System and Data Life-Cycles

4.1 ACMS Support of Weapon System Life-Cycle. The envisioned scope of ACMS is to be the Army's enterprise engineering and technical data manager throughout the life-cycle of a weapon system -- from program development, through production, operation, sustainment, modification, and ultimately disposal of the system. The following paragraphs describe the role and support ACMS provides from the perspective of a weapon system's life-cycle.

4.1.1 Development

4.1.1.1 *Continuous, Concurrent, and Wide-Spread Access*. During weapon system development, ACMS is intended to be the Army's primary mechanism for maintaining continuous and concurrent visibility into the content and status of developing weapon system engineering and technical data. ACMS will be a key tool used by the Army to support the execution of the Integrated Product and Process Management (IPPM) concepts for developing weapon systems. Under the IPPM concept, IPTs will be formed from all user communities who have responsibility for, use, or support the weapon system at some point in its life-cycle. By having ready access to developing data, members of the IPT may influence the design early and avoid excessive life-cycle costs or expensive changes late in the system's development or manufacture. Examples of user communities include the following:

4.1.1.1.1 Designers and engineers who develop the system,

4.1.1.1.2 Testers who will test the weapon system,

4.1.1.1.3 Manufacturers who must build the system,

4.1.1.1.4 Program managers who must manage the system's development,

4.1.1.1.5 Trainers who will develop training courses,

4.1.1.1.6 Operational users who must use the system in the field,

4.1.1.1.7 Logisticians and maintenance personnel who must sustain and maintain the system,

4.1.1.1.8 Item managers who will buy replacements and spares for the weapon system,

4.1.1.1.9 Operations planners, analysts, and modelers who will plan and study the best ways to employ the system, and

4.1.1.1.10 Authors and subject matter experts who will write technical and operations manuals for the weapon system.

4.1.1.2 *Example Uses*. Through ACMS, authorized members of an IPT who create engineering data will be able to save data in secure storage areas with controlled access, promote data through various release levels, baseline product structures and data, and configuration control the data. Other authorized IPT members who do not create the engineering data, but use it will be able to find and retrieve engineering data they require; receive task notifications and accompanying engineering data via workflows and messaging capabilities contained within ACMS; view, comment on, and mark-up or redline engineering data using viewing tools provided by ACMS; and participate in design and engineering change evaluations even though the individual members of the IPT are geographically and organizationally dispersed. Members of the IPT will have concurrent access to the engineering and technical data, although ACMS will preclude multiple users from being able to simultaneously change (revision) the data. Note that in the context of ACMS, controlled data will never be changed, but it may be revisioned.

4.1.2 Manufacture. By making design data accessible as it evolves, ACMS will enable the manufacturing community to be aware of and more readily influence the design of a weapon system. Additionally, during weapons system manufacture, ACMS will enable authorized members of the manufacturing community to rapidly find and retrieve design, manufacture, test, and analysis data that affect the development of manufacturing processes, the acquisition or configuration of manufacturing equipment, and the procurement of materials. This will facilitate early planning and the evaluation of manufacturing alternatives. For example, manufacturing simulations can be prepared early on based on evolving engineering data. These simulations may reveal design problems from a manufacturer's perspective, but also will enable the manufacture to begin planning the production process sooner. Additionally, members of the manufacturing community will be able to initiate change proposals or participate in their evaluation using ACMS' engineering change forms, workflows, and viewing and mark-up capabilities. ACMS will provide them with access to supporting engineering data, thus enhancing the quality ECPs. ACMS also will enable a preparer of an ECP to determine if similar or related ECPs are in process, have been rejected, or have been approved.

4.1.3 Operation. ACMS will provide authorized operational users of the weapons system with rapid access to data they need to more efficiently plan the system's use, operate the system, and employ the system. For example, operations analysts might use physical attributes of the system as input into an operational simulation. The simulation would indicate how well the system performed in a specified scenario. In another example, force planners might use design and engineering data to determine interoperability between systems. In yet another example, deployment planners might use engineering data to determine or simulate transportation requirements for the weapon system. Additionally, survivability analysts could access design data that provides inputs to survivability models for predicting weapon system survivability against certain threats in certain scenarios. Like members of the manufacturing and other communities, authorized operational users will be able to initiate change proposals or participate in their evaluation using ACMS' engineering change forms, workflows, and viewing and mark-up capabilities. ACMS will provide them with access to supporting engineering data, thus enhancing the quality of ECPs. ACMS also will enable a preparer of an ECP to determine if similar or related ECPs are in process, have been rejected, or have been approved.

4.1.4 Sustainment. Both logisticians and maintenance personnel will benefit from ACMS' ability to provide them with access to needed engineering and analytical data. Logisticians could use the design or

analytical data to help them predict replacement and spares rates. Maintenance workers could access ACMS when servicing equipment in the field when a particularly unusual or difficult maintenance event occurs. A field maintenance worker also could use ACMS' remote access capabilities via a web browser to initiate an ECP to initiate a correction to a problem only discovered in the field. An example would be a design that makes it impossible to remove a component after item manufacture. Both logisticians and maintenance personnel will be able to initiate change proposals or participate in their evaluation using ACMS' engineering change forms, workflows, and viewing and mark-up capabilities. ACMS will provide them with access to supporting engineering data, thus enhancing the quality of ECPs. ACMS also will enable a preparer of an ECP to determine if similar or related ECPs are in process, have been rejected, or have been approved.

4.1.5 Disposal. Disposing, recycling, or salvaging retired weapon systems can benefit for ready access to engineering and technical data via ACMS. With ACMS the individuals responsible for the disposal of a system will be able to better plan through access to data on the various configurations that have been fielded. They also will be able to identify hazardous or precious materials that may be included in the system. If desired, the technical data could include handling instructions for these materials. Like the other communities involved in the life-cycle of a weapon systems, the disposal community will be able to develop, receive, and evaluate ECPs via ACMS.

4.2 ACMS Operation within Engineering Data Life-Cycle. The above discussion described ACMS' role in managing engineering and technical data throughout a weapon system's life-cycle. Another perspective of data management needs to be considered when specifying the ACMS concept of operations. That is the perspective of engineering data's life-cycle -- from its acquisition or creation, through its management and use. The following paragraphs describe the role and support ACMS provides from the perspective of the data's life-cycle.

4.2.1 Data Acquisition

4.2.1.1 *Overview*. Engineering data acquisition involves the creation, revision, purchase, conversion, or any other method of obtaining new Army engineering data. The acquired data may be authored by the Army, developed for the Army (under contract), or purchased by the Army. Acquired data also includes new versions of existing data which often are considered to be modifications of old data (controlled data never changes). The acquired data may be physically retained by the Army or by a third party such as a contractor. The new data includes actual engineering data representations of products (e.g., drawings, models, and documents), product structure representations, configuration control data, ECPs, mark-ups and redlines, relationships between data, relationships between data and product structure elements, and other data about the engineering data (metadata). All are types of data captured and controlled by ACMS.

4.2.1.2 *Operational Concept*. ACMS will support the engineering data acquisition life-cycle phase primarily by providing the means to introduce acquired data into the ACMS environment of managed data. With a few exceptions, as described later in this paragraph, the actual authoring of engineering data is outside the domain of ACMS. For example, ACMS will support the introduction of acquired data into the Army's environment of managed data by providing the ability to capture and securely store authored data via its data vaulting capabilities. ACMS also will provide mechanisms for obtaining engineering data and metadata from contractors. These mechanisms will be based on standards such as the STEP, CALS, and MIL-STD-2549, along with an open and published API. In these cases the actual authoring of the data is done external to ACMS. On the other hand, ACMS will support the direct creation of some engineering data by providing data authors with the capability to build product structures, assign relationships between data items, and establish relationships between data items and product structure elements. Using system administrator configurable forms and automated rules, ACMS also will enable authors of data to initialize configuration control data such as assigning configuration item identifiers. In another example of data authors creating data using ACMS, they will be able to generate ECPs and record their evaluations of ECPs

by using ACMS forms and viewing/mark-up tools. The following subparagraphs provide descriptions of specific ACMS operational capabilities that will support the acquisition of Army engineering data.

4.2.1.2.1 *Secure Data Storage*. ACMS will provide for secure storage of acquired engineering data in accordance with defined access control permissions and rules. Secure storage is defined as the ability to preclude stored information from being viewed, reused, updated, or deleted in violation of ACMS access permissions and rules. Examples of the kinds of data ACMS will store and protect include product data files and/or documents (native or standard formats), metadata associated with managed product data, administrative data, references to data external to ACMS, records in an associated database, and electronic forms such as ECPs.

4.2.1.2.2 *Data Check-In*. Checking data into the ACMS is the means by which engineering data is entered into the ACMS environment of managed data. Upon initiation of the check-in function, ACMS will present, a data author with a form of required ACMS metadata. The metadata fields on the form will be empty or contain existing or default values (Default values are for new data that is being loaded for the first time. Existing values are for data that is being revisioned.). The user will enter, modify, or accept the metadata and proceed with the check-in operation. ACMS will then move the data and metadata from the user's workspace into the ACMS vault to which the user is assigned. ACMS will notify the user as to the success of the transaction and make the core metadata available to all systems within the ACMS federation. The user will not need to know the actual physical location of the data. If the data had been checked out for revision, ACMS will release the check-out lock at this time.

4.2.1.2.3 *Populating JEDMICS*. Loading JEDMICS with acquired Army data is a special case for ACMS data check-in. Army data owners or authors will populate JEDMICS with engineering data by using ACMS check-in features. The data owner or author will login to his or her normal ACMS host. ACMS will present required ACMS metadata with default values to the user who will modify or accept the metadata. From this metadata, ACMS will prepare the associated JEDMICS file index data. The user will then initiate the JEDMICS load procedure. ACMS will move the data from the user's workspace and transmit both the file index data and engineering data to JEDMICS. JEDMICS will store the engineering data received from ACMS and populate the JEDMICS file index with the necessary metadata provided by ACMS. JEDMICS will then send ACMS any file index data that JEDMICS produces or revises (e.g., file location) back to ACMS. ACMS will then update its own metadata to keep the systems synchronized. If necessary, JEDMICS will send ACMS notices that indicate whether or not the transaction was successful. ACMS will present the notices to the user for his or her action if necessary. Using ACMS to load JEDMICS with new Army engineering data will preserve the integrity of ACMS metadata and ensure ACMS and JEDMICS are synchronized.

4.2.1.2.4 *Translate Files*. In the future, ACMS will include a set of file translators that produce STEP and CALS compliant formats. In support of user requests for data, ACMS will schedule and route files to appropriate file translators, apply default settings for translations, initiate the translation, and route the output file to the user.

4.2.1.2.5 *Build Product Structures*. The creation of product structures is a form of engineering data authoring. ACMS will provide for the creation of new product structure elements such as assemblies, components, and parts. These parts may then be associated (i.e., related or linked) in a hierarchical manner to represent a newly defined item. ACMS will present the hierarchical product structures to users via a graphical display. Product structures may be revised and retained as new versions. ACMS will provide for the establishing, recording, and maintaining multiple versions for a given part, component, or assembly. ACMS also will provide the ability to specify and maintain product structure effectivity information on when a part version is valid for use in assembling a particular version of a product.

4.2.1.2.6 *Establish Relationships*. In addition to the product structure relationships described above,

ACMS will be the authoring tool for defining the following kinds of relationship data: links between engineering data and product structure elements, links between two data items, and the type of links themselves. The links between engineering data and product structure elements are the means by which engineering is associated with particular product structure elements. These are the links that will enable ACMS users to find engineering data by navigating product structures. The links between data items are the means by which two pieces of engineering data are related to one another. The nature of the relationship is defined by the type of link. The type of data link itself can be created and defined, thus allowing data authors to establish new ways of describing the relationships between data items.

4.2.1.2.7 *Create ECPs*. A change initiator will login to ACMS for the purpose of building an ECP. Once into ACMS, the change initiator will request a standard ECP form. ACMS will present the form, which may have been tailored by the local system administrator, to the change initiator who inspects the default data provided by ACMS and makes changes and adds data as necessary. ACMS will automatically assign the next available unique ECP number. The change initiator will use ACMS' query/search and/or product structure navigation capabilities to find any engineering data that needs to be attached to the ECP form and submit the ECP for consideration via a predefined ECP workflow.

4.2.1.2.8 *Redline Images* . Redlined or marked up viewable images are another kind of data that is acquired using ACMS. ACMS will provide the ability for multiple reviewers to create red-lines, mark-ups, or annotations to viewable images. This reviewer created data will be controlled and maintained in conjunction with the viewable image. ACMS will ensure, however, that individual reviewer red-lines and annotations are kept distinct.

4.2.1.2.9 *Web-Based Access*. Web-based access to the ACMS is relevant to the data acquisition life-cycle phase because data authors with access to a web browser will be able to use a browser to check data into ACMS using the browser and the Internet.

4.2.1.2.10 *Acquire Metadata*. Metadata will be acquired via ACMS from both data authors and external data management systems. When checking in data, ACMS will present the author or owner with a predefined form to be completed. Where default values exist, ACMS will populate the form with those defaults for the author to modify or accept. ACMS will store and control access to the metadata for future use. Metadata will also be obtained by ACMS from external data management systems. At a minimum, ACMS will be capable of importing MIL-STD-2549 data elements for external systems.

4.2.2 Data Management

4.2.2.1 *Overview*. In the data management phase of engineering data's life-cycle, the main objective is to control the data in such a way that the data is protected without unnecessarily burdening the authors of the data while also facilitating the ease in which authorized users of the data are able to find, retrieve, and work with the data. The main activities under data management include storing data, protecting data by controlling access while making it easily accessible to authorized users, configuration managing data, distributing data in response to authorized requests, archiving and backing up data, and recording the status of data and changes in that status.

4.2.2.2 *Operational Concept*. Within the Army's concept for engineering data management, ACMS will be the Army's corporate engineering data management system with visibility into and configuration control of all official engineering and technical data. As a federation of systems at the individual commands, however, ACMS will share control of the data with the individual systems. This means that while the local component of ACMS will exercise physical control over the data, any ACMS user will be able to find and retrieve any data maintained within the ACMS federation. The notion of shared data control is further extended when ACMS exchanges metadata with external PDM, CM, or CITIS systems. This exchange will provide ACMS with visibility into what data is available and where it is located. As the Army's

primary mechanism for accessing the data, ACMS will interact with the external systems to request the data be provided when needed. The following subparagraphs provide descriptions of specific ACMS operational capabilities that will support the management of Army engineering data.

4.2.2.2.1 *Store and Protect Data*. ACMS will provide a data vaulting capability for the storage of engineering data that is not kept in repository systems such as JEDMICS. The ACMS vault will not only securely store traditional engineering data such as drawings, models, and documents, but it also will store and protect viewable images, redlines and mark-ups of viewable images, metadata associated with managed engineering data, administrative data, references to data external to ACMS, records in an associated database, and electronic forms such as ECPs. ACMS will protect the data by restricting access to the data in accordance with defined access control permissions and rules. ACMS will have the ability to vault data under its control in distributed vaults. ACMS will protect Army data stored in JEDMICS by serving as the Army's single entry point into JEDMICS for the purposes of both loading and retrieving data.

4.2.2.2.2 *Locate Data*. Users of ACMS will be able to locate and retrieve any data managed under the ACMS federation of systems. An Army data user will find engineering data by either using search queries against metadata or via product structure navigation. It will not be necessary for the user to know the specific location of the data in the ACMS federation. The user will be prevented from searching on metadata for which he or she is not authorized to see. Similarly, the user will precluded from navigating product structures for which he or she is not authorized to view.

4.2.2.2.3 *Control Access to Data*. Access control is the mechanism by which ACMS protects the integrity of engineering data and guards it from unauthorized identification and retrieval. ACMS will manage and monitor authorizations and restrictions to data. It also will protect the integrity of the data through check-in and check-out functions.

4.2.2.2.3.1 *(Authorizations and Restrictions)* -- ACMS will provide for checking the identity and authorizations of users and restrict their ability to see metadata, navigate product structures, and retrieve data as defined by access control permissions and rules. These permissions and rules will enable system administrators to restrict access to ACMS by type of information, the status of the data (release level or specific baseline), data sensitivities and distribution limitations, and the roles assigned to a user or group. ACMS access rules will define the types of access allowed to users, groups, or roles (create, read, use, or delete). Attempts to access ACMS data will be monitored and users whose unsuccessful attempts exceed a system administrator specified maximum threshold will be exited from the system and the unauthorized attempts to access data will be recorded.

4.2.2.2.3.2 *(Data Check-In and Populating JEDMICS)* -- Data check-in is an operation that supports both the data acquisition and data management life-cycle phases. It is the means by which new or revised data is brought under ACMS' control, hence the association with data acquisition. It also is a means of managing the integrity of controlled data, hence the association with data management. A discussion of data check-in is included in the data acquisition section and is not repeated here. Populating JEDMICS is a special case of data check-in. It also is discussed in the data acquisition section.

4.2.2.2.3.3 *(Data Check-Out)* -- Once the desired data is found, either as the result of a successful search or through product structure navigation, the user will initiate the ACMS check-out function. If the user is authorized to access the data, ACMS will respond by moving the requested files or information (e.g., database records) from the ACMS vault to the user's workspace. Upon check-out, ACMS will lock the requested files to prevent multiple users from attempting to modify the data simultaneously. Other users will be allowed to view and copy the checked out data (the copy would be treated as new data), but they would not be able to modify it or create new versions until the check-out is released. ACMS will update the metadata to show who has the data checked out and will provide the ability to view which user has checked the data out from the vault. If the user who has checked the data out decides he or she no longer

intends to modify the data and only wants to view the data or work with a copy, then he or she may release the lock if so desired, thus freeing the check-out for other users.

4.2.2.2.3.4 *(Retrieve JEDMICS Data)* -- Army data users will check engineering data out of JEDMICS via ACMS. The data user will login to his or her normal ACMS host. An ACMS user will find desired data using search queries or product structure navigation. The user will initiate the ACMS check-out function and ACMS will prepare and transmit request for the data to JEDMICS. ACMS will receive the data from JEDMICS and present it to the user. If necessary, JEDMICS will send ACMS notices that indicate whether or not the transaction was successful. By using ACMS to retrieve JEDMICS data, it will be possible to manage use of Army engineering data, make sure that users are receiving the correct data, and facilitate concurrent engineering efforts. The same file locking and metadata update procedures described earlier in will apply for checking out JEDMICS data.

4.2.2.2.4 *Distribute Data*. ACMS will provide for the routing and transport of data in support of numerous operations and events. Specifically, ACMS will move data between a user's workspace and ACMS' data vault in response to check-in and check-out operations, pre-defined event triggers, or workflow prompts. ACMS also will support data exchanges with among the systems within the ACMS federation and with external repositories, PDM, configuration management, and CITIS systems. ACMS will record information about the data transport transaction. For example, ACMS should record the time, initiator, and recipient of the transaction.

4.2.2.2.5 *Exchange Data with External Data Management Systems*

4.2.2.2.5.1 *(Receiving Data)* -- ACMS will be responsible for providing visibility into and access to all Army engineering data. When Army data is controlled by and vaulted in data management systems external to the ACMS federation, ACMS will need to be capable of receiving both engineering data and data about this engineering data (metadata) from the external data management system. Examples of these external data management systems include PDM, CM, CITIS, or authoring systems. To accomplish this, ACMS will need to have a published API and will need to migrate towards the configuration management data interface standard (MIL-STD-2549) as the means for defining what metadata must be exchanged among ACMS and other PDM, CM, and CITIS systems. MIL-STD-2549, *Department of Defense Interface Standard, Configuration Management Data Interface*, defines the minimum core metadata which must be sharable within and outside the ACMS federation. The data elements describe the configuration management data needed to support the principles of configuration management specified in EIA/IS-649, *National Consensus Standard for Configuration Management*. These data elements and the relationships depicted in MIL-STD-2549 also provided the basis for exchanging rudimentary product structure information in the form of parts list and Bill of Materials (BOM) data. Once ACMS determines that the desired data is located in an external system and if the user requests the data, then ACMS will formulate a request for the engineering data, initiate a session with the system that controls and stores the data, submit the request, receive the requested data or appropriate response notice, and present the results (data or response notice) to the ACMS user. As a result, Army data users will be able to check-out Army engineering data via ACMS even when ACMS does not directly manage the data.

4.2.2.2.5.2 *(Providing Data)* -- ACMS also needs to be capable of providing engineering data and metadata to external systems when the Army provides engineering data to contractors or other government entities. As a result, ACMS will be capable of exporting MIL-STD-2549 data elements for external systems.

4.2.2.2.5.3 *(Synchronization with External Data Management Systems)* -- In some instances, ACMS will need to be kept synchronized with an external data management system. Depending on the level integration between ACMS and the external data management system, this synchronization will either be done automatically or procedurally. The approach will be determined during implementation. An example

of a procedural approach to synchronization between ACMS and an external data management system is when the owner or author of the data assumes responsibility for logging into ACMS and updating ACMS as to the state of the controlled data. Automatic synchronization can occur several ways. One approach involves integrating ACMS into the external data management system, so that access to and control of the data is through ACMS. Other methods of automatic synchronization include pushing metadata about changes to the engineering data from the external data management system to ACMS on a regular basis. Another approach involves ACMS pulling the state change metadata from the external data management system by polling system at regular intervals. A third approach to automatic synchronization involves retrieving the metadata from the external data management system on a "when needed" basis and comparing the retrieved metadata with ACMS' metadata to determine if changes have occurred.

4.2.2.2.6 *Workflow Capabilities*. ACMS will include the ability to distribute tasks and data via workflow capabilities. Specifically, ACMS will provide users the ability to build, participate, and monitor pre-defined and ad hoc workflows. ACMS will permit users to build, participate, and monitor ACMS workflows using a web browser across the Internet or via a regular ACMS client application.

4.2.2.2.6.1 *(Workflow Builders)* -- Certain ACMS users will be able to build workflows. These workflows may be saved as templates or executed as ad hoc workflows. The creator of a workflow will be able to build sequential and concurrent tasks, establish timed and event triggers, and assign roles to users with specific data access rights for specific tasks within the workflow (may temporarily restrict or expand a user's rights when the task becomes active).

4.2.2.2.6.2 *(Workflow Participants)* -- A participant in a workflow will receive notifications of workflow tasks. ACMS will enable participants to check their work queues, select a specific task on which to work, read any task messages or notifications that accompany the task, retrieve data that has been associated with the task, and electronically sign-off on task completion or data.

4.2.2.2.6.3 *(Workflow Monitors)* -- Selected ACMS users will be able to monitor the progress of tasks within the workflow. This includes being able to determine which tasks have been completed, which tasks are late, and the workloads of individuals participating in the workflow. Again this function may be performed either via a web browser or the ACMS client application.

4.2.2.2.7 *Configuration Manage Product Structures and Engineering Data*. ACMS will configuration manage product structures and engineering data in accordance with the guidance provided in MIL-HDBK-61, *Configuration Management Guidance*, and MIL-STD-2549, *Configuration Management Data Interface*. Specifically, ACMS will enable users to record the following: 1) the unique identifiers for configuration items (CIs) and their subordinate parts and assemblies , 2) the identifier of each CI's configuration control authority, 3) the unique identifier of configuration baseline engineering data, 4) the release and baseline status of any ACMS controlled product structure or data item, 5) the correlation between engineering data and the product item it represents, 6) the unique file identifiers (to include version number or time/date stamp), 7) the part numbers corresponding to CIs and subordinate parts and assemblies, 8) the effectivity and release times and dates for product structures and data, 9) the identifiers and status of ECPs and requests for deviations (RFDs), 10) the results of configuration audits, and 11) ECP and audit actions assigned to individuals.

4.2.2.2.8 *Record and Report on Data Status*. ACMS will record and present to authorized users the release, baseline, change, and audit status of product structures and engineering data. In particular, ACMS will provide authorized users with the capability to record the release levels of specific product structures and engineering data, when the product structure or data was promoted to the indicated release level, and when the release became effective. Authorized users will be provided the ability to generate displays and reports containing the above release status data. ACMS also will enable authorized users to record the identity of a baselined product structure and related configuration data, along with when the baseline was approved and the effective date of the baseline. ACMS will also record and report on the status of

engineering changes, actions associated with the changes, and the implementation status of changes. As audits are performed, ACMS will record and report on the schedules, status, and results of configuration audits.

4.2.2.2.9 *Archive and Backup Data*. ACMS will provide system administrators with the tools necessary to establish and maintain archives and backups of data kept in ACMS vaults. In the event of corruption or other damage to the ACMS data vault, ACMS will enable system administrators to restore the system from backups. Similarly, ACMS will provide system administrators with the tools needed to request and retrieve historical archives information from off-line archival storage.

4.2.3 Data Use

4.2.3.1 *Overview*. Use of data within engineering data's life-cycle involves all activities which require a direct interface with a consumer of the data, as opposed to an author or manager of data. Example activities performed by consumers include finding, requesting, receiving, viewing, analyzing, processing or manipulating, and printing data. Sometimes copying and redlining data are considered activities within the data use life-cycle phase, but for the purposes of this discussion, they are part of the data acquisition (creation) phase (discussed earlier).

4.2.3.2 *Operational Concept*. ACMS is a data management system. Its support of the data use life-cycle phase is limited to assisting consumers of data in finding, requesting, receiving, viewing, and printing data. There are two categories of ACMS data consumers: individuals and applications. Individuals typically will interact with ACMS via ACMS client software or across the Internet using a web-based browser. Individual consumers will find data by navigating product structures to locate relevant data or searching for classes of products or data via queries against metadata contained in ACMS. Once data is located, the individual consumer will initiate a request for the data which ACMS will retrieve and present to the consumer. After receiving the data, the consumer will use ACMS or local viewing tools to view the data and, if desired, print the image. Applications which are consumers of Army engineering data will interact with ACMS by an open and published interface. The interface may involve exchanging engineering data or metadata, or it may involve the application invoking an ACMS feature. The following subparagraphs provide descriptions of specific ACMS operational capabilities that will support the management of Army engineering data.

4.2.3.2.1 *Navigate Product Structures*. Users of ACMS will be able to locate and request data managed under the ACMS federation of systems by navigating product structures. The user will only be able to navigate product structures for which he or she is authorized to view. Product structures may be navigated via ACMS' web-based browser capability or via ACMS client software. It will not be necessary for the user to know the specific location of the data in the ACMS federation.

4.2.3.2.2 *Search Data Attributes*. ACMS users also will be able to search for engineering data by constructing queries against product data attributes. ACMS will provide the ability to classify data by groups which share a common set of required attributes. Once a user determines which class of data they need, it will be possible for the user to build queries to locate particular instances of the class. The queries, which may be saved for later reuse, will provide the ability to search attributes associated with the particular classification for specific values, ranges of values, and logical combinations using Boolean operations. Because the system administrator will have the ability to restrict user's access to specific product data attributes, ACMS will also be able to restrict the types of queries users can create. Data searches via queries may be created and initiated from ACMS' web-based browser capability or from the ACMS client software. As before, it not be necessary for the user to know the specific location of the data in the ACMS federation.

4.2.3.2.3 *Request and Retrieve Data*. Once data has been found within ACMS, either as the result of a

successful search, through product structure navigation, or association with a workflow task, the user will initiate the ACMS check-out function. If the user is authorized to access the data, ACMS will respond by moving the requested files or information (e.g., database records) from the ACMS vault to the user's workspace. ACMS will perform this operation regardless of whether the user has accessed ACMS via a web browser or via an ACMS client application. In some cases, the request for data includes launching a viewing or authoring application. If the requested file requires translation prior to presentation to the user and an appropriate translator has been included as part of ACMS, then the request and receipt of the data will trigger an automatic translation of the data for the user.

4.2.3.2.4 *View Images*. ACMS will provide a number of imaging services that enable a user to view and redline images. ACMS will provide for the launching of viewing and redlining software applications via file associations. When a file is checked out using ACMS and the file type is of a particular type, ACMS will launch the appropriate software to either view, redline, or, in some cases, first translate the file to a form that can be viewed or marked up. ACMS will control and protect the viewable and redlined images. ACMS also will ensure that individual reviewer redlines and annotations are kept distinct.

4.2.3.2.5 *Print Data*. As part of its support to the data use life-cycle phase, ACMS will provide users with the ability to print viewable images and redlines.

5. ACMS Support to Selected Business Processes

5.1 Introduction. The following paragraphs present examples of ACMS operational capabilities being applied in support of three business processes. This is done to tie the various operational capabilities described in paragraph 4 and illustrate their use in Army processes that require engineering and technical data. The three processes presented are Integrated Process Team (IPT) Information Sharing, Engineering Change Proposal (ECP) Processing, and Technical Data Package (TDP) Validation.

5.2 IPT Information Sharing. During system development, ACMS will provide authorized IPT members simultaneous access to current, relevant engineering data. IPT members are apt to be geographically dispersed and represent a variety of communities, each having different life-cycle responsibilities for the system. As such, they will work with the data in different ways. All will require the ability to rapidly identify data they need and to retrieve that data in a form in which they can use the data.

5.2.1 Data Creation. Creators of data on an IPT will use ACMS to create working and released data. Both types of data will be vaulted in a secure environment where access to the data is strictly controlled via user, group, and file type permissions.

5.2.1.1 *Working Data*. Working data represents work in-progress. Only data creators may make changes to the data, but select members of the IPT may be given view or copy access to the data. In the early stages of its life, working data may be non-versioned. In this circumstance, the state of the data is highly dynamic, but still stored in a secure, non-versioned vault where other members of the design team and possible members of the IPT can access the data. Data creators are trusted to coordinate changes they make, but are not required to establish new versions until the data reaches an appropriate level of maturity. When a change is being made, the non-versioned data is checked out from ACMS. This locks the data from changes by others, but does not preclude other users from copying or viewing the data. When the data is checked back in, the data is released for check-out by others, but is not versioned. As the data matures, the design team may elect to move their working data into a versioned vault. Once this happens, each time the data is check-out, revised, and then checked back in to the vault, a new version is created. Eventually, as the data matures further, it will become time to formally release the data for access to a wider audience. ACMS will enable the current data change authority to have a workflow created for release review (or retrieve a saved workflow). The candidate release data will be figuratively routed through the workflow

along with an electronic release review form where comments and electronic sign-offs can be captured. Reviewers will retrieve the data using ACMS, mark-up or redline a viewable image, add comments to the review form, and either recommend the data be reworked or add their electronic signatures to the sign-off. When the data successfully progresses through the review, the data will transition from working data to released data and will be subject to formal configuration control rules and processes.

5.2.1.2 *Released Data*. Released data represents data that is under formal configuration control. It may not be changed, but new versions can be created via a formal engineering change process (described later). Released developmental data, delivered data, and baselined data can fall into this category of data. Like working data, released data is vaulted and subject to access control rules. New versions of released data may be created, but it does not constitute a new release until after an engineering change proposal successfully passes through the formal engineering change process. A trusted data creator then checks out the current version of the released data, makes changes using an authoring application, and then saves (checks in) the revised data as a new version and a new release. Changes to baselined releases of data is supported in a similar manner. The difference is that the change control process must go through a Configuration Control Board (CCB) prior to accepting the change and, both the release status attribute and the baseline status attributes of the data will change

5.2.2 Concurrent Access to Data A key assumption in the use of IPTs is that members will have simultaneous access to current, relevant engineering data. Sometimes this required data will be working data. In other cases, the data will be released and possibly baselined data. In either case, ACMS will make the data available to authorized IPT members. It also is desired that their access to the data be based on their responsibilities and roles, not where they are geographically or organizationally.

5.2.3 IPT Member Access to Data. ACMS will allow members of an IPT to login to ACMS via ACMS client software or a commercial web browser. Based on the member's rights as determined at login, ACMS will control the member's access to metadata and the actual engineering data. The IPT member will be able to search or navigate ACMS for engineering data or metadata about a particular part, component, or product. Searches will be possible via query or search forms. These queries or searches will be performed against attributes of the engineering data contained in the set of metadata. The actual forms will be customizable by the ACMS system administrator. ACMS also will enable the IPT member to find data by navigating product structures. Once desired engineering data is found, the IPT member will be able to request either a display of metadata, a viewable image of the engineering data, or the source data (e.g., CAD model). If the data is checked out by someone else, ACMS will retrieve a copy of the requested data. If the data is available for check-out and the IPT member has check-out permissions, ACMS will check the data out and present it to the IPT member. In some instances, ACMS will actually provide the tool necessary to view or translate data. In other instances, ACMS will launch a viewing or authoring application for the member. Displays of metadata will be customizable by an ACMS system administrator.

5.2.4 Data Use as Part of a Workflow. Many IPT members will be users who do not create data, but review, evaluate, or reference engineering data on an regular basis. This can be done as part of a specific task for which they are responsible, in preparation for a major milestone, or as part of a process such as obtaining approvals to release engineering data. In some of these cases, the IPT members will need to find, retrieve, and view data just to understand the current state of the requirements, design, or manufacture. In other cases, they will be an active participant in a pre-defined or ad hoc workflow where they need to review data purposes as part of an assigned task. The following paragraphs describe IPT use of ACMS in a workflow situation.

5.2.4.1 *Workflow Builder*. Certain members of an IPT will be able to build ACMS workflows. These workflows can be saved as templates or executed as ad hoc workflows. IPT members who build workflows will be able to build sequential and concurrent tasks, establish timed and event triggers, and assign users to roles with specific data access rights for specific tasks within the workflow. Workflows may be built so

that the rights of specific users or the rights associated with specific roles are temporarily restricted or expanded once the task becomes active.

5.2.4.2 *Workflow Participant*. As a participant in a workflow, an IPT member receives notifications of workflow tasks. ACMS will enable IPT members to check their work queues, select a specific task on which to work, read any tasking messages or notifications that accompany the tasking, retrieve data that has been figuratively attached to the tasking, and electronically sign-off on tasks or data.

5.2.4.3 *Workflow Monitor*. Selected IPT members will be able to use the web browser to monitor the progress of tasks within the workflow. This includes being able to determine which tasks have been completed, which tasks are late, and the workloads of individuals participating in the workflow.

5.3 ECP Processing. ACMS will support engineering change proposal (ECP) processing using workflow management capabilities, predefined forms, linking of change data to ECP documents, and voting and electronic sign-off capabilities. ACMS where-used product structure management capabilities and product to data associations also will enable ACMS to facilitate change impact analyses. ECP processing involves creating an ECP, routing the ECP and attached documents to participants in the ECP evaluation process, performing change evaluations, capturing comments and mark-ups, approving proposed changes (voting and electronic sign-off), and initiating change implementation actions (work orders and instructions).

5.3.1 Creating an ECP. A change initiator logs in to ACMS for the purpose of building an ECP. The change initiator requests a standard ECP form from ACMS. ACMS presents the form to the change initiator who inspects the default data provided by ACMS and makes changes and adds data as necessary. ACMS will automatically assign the next available unique ECP number. The change initiator uses ACMS' query/search and product structure navigation capabilities to find any engineering data that need to be figuratively attached to the ECP form. The ECP form may be customized by the local system administrator.

5.3.2 Creating an ECP Workflow. Depending on the ECP and local operational procedures and preferences, ECPs can be distributed via ACMS' predefined or ad hoc workflows. ECP workflows can be built from sequential and concurrent tasks, can have timed and event triggers, and can assign users to roles with specific data access rights for specific tasks within the workflow (may temporarily restrict or expand a user's rights when the task becomes active).

5.3.3 Distributing an ECP and Attached Documents. A change initiator submits an ECP form and attachments for distribution to change evaluators. Depending on command preferences, there are several options for initiating the distribution of an ECP. One option is to send the ECP and attachments to a change administrator who is then responsible for further distribution of the ECP (e.g., invoking an appropriate workflow). A related option is to establish a "drop box" location in ACMS for candidate ECPs. The change administrator would periodically checked the "drop box" and distribute new ECPs. A third option is to configure or customize ACMS to automatically route a new ECP in accordance with a predefined workflow, once the ECP is submitted by a change initiator. In this case, a new ECP triggers an automatic process within ACMS. Regardless of the option for initiating a distribution, participants in the workflow will be assigned, their roles established (which in turn establishes their access rights), and ECPs will be routed based on predefined or ad hoc workflows.

5.3.4 Performing Change Evaluations. Participants in an ECP workflow will be notified by e-mail of tasks. ACMS will provide workflow participants with a means to identify outstanding workflow tasks. Participants will select tasks on which to work and use ACMS to retrieve data necessary to conduct the ECP evaluation. Data attached to the ECP will be retrieved directly from ACMS' representation of the task. Any other technical or engineering data that the evaluator deems necessary will be located and retrieved using ACMS' query/search, product structure navigation, and check-out capabilities.

Additionally, evaluators will use ACMS' where-used capabilities and multiple views of product structures to facilitate the conduct of impact analyses. For example, a manufacturing view of the product structure will help identify manufacturing process data that may be impacted by a proposed change. Likewise, a testing view of the product structure might reveal the need to change test plans. The ACMS ECP form will include the capability to attach evaluator comments and recommendations. In some cases, evaluators will use the mark-up or redline features of ACMS on viewable images to indicate concerns or recommendations. In other cases, an evaluator may retrieve a copy of data from ACMS and use an authoring application to create an alternative to the proposed change. This would be saved as new data, separately controlled, but attachable to the workflow. Upon completion of the evaluation, an evaluator will electronically indicate task completion using ACMS. This will trigger ACMS to move the ECP on through the workflow.

5.3.5 Approving Proposed Changes (Voting and Electronic Sign-Off). At some point in the ECP workflow, members of the Configuration Control Board (CCB) will be tasked to vote on the acceptability of the ECP. ACMS will provide the ability to record these votes and protect against unauthorized or premature voting. ACMS also will tabulate the votes and present them to the individual responsible for formally approving the ECP. ACMS will record the electronic sign-off or rejection of the ECP.

5.3.6 Initiating Change Implementation Actions. As a result of a decision to make a change, it is necessary to initiate a series of change implementation actions. Depending on individual command preferences and policies, the change implementation actions can be initiated and managed via ACMS workflow capabilities. A change implementation workflow would start with a CCB directive which orders that the change be made. This directive would be submitted to an ACMS workflow with relevant contract, program management, and financial data as attachments. Contracts personnel will be tasked to negotiate contract modifications. Program managers or task leaders will then be tasked via the workflow to develop change instructions which in turn will be routed to engineers via the ACMS workflow capabilities. Engineers will design the directed changes using data checked out from ACMS. The engineers will create new versions of the data, but that data will not be released as the new, baselined version of the product until after it has gone through a release review. The release review also will be supported by an ACMS workflow. Upon approval of data's release (captured electronically in ACMS), a "trusted user" will promote the appropriate version of the data to be the new baseline for the product. The "trusted user" also will enter effectivity information relevant to the new, baselined version of the product data. ACMS will maintain a audit trail of changes. ACMS also will disseminate change notifications to individuals previously identified as needing to know about changes to a product's data.

5.4 TDP Validation. ACMS will support validation of Technical Data Packages (TDPs) by automatically responding to reprocurement event triggers, assembling a technical data package list (TDPL), presenting links to the data referenced by the TDPL, and then initiating an appropriate TDP review workflow that culminates in approval and certification of the TDP via electronic sign-off. This process starts with the identification of a need for a part by procurement (Inventory Management). A Procurement Work Directive (PWD) and a Procurement Request Order Number (PRON) are generated by the Inventory Manager's system in response to the need to procure a replacement or spares. The process ends when the certified TDP is sent to procurement.

5.4.1 Initiate Validation. An Inventory Manager, or an automated system supporting Inventory Management, will determine a need to procure replacements or spares. This will result in creation of a PWD and a unique PRON which is sent to the Configuration Manager. If the PRON and PWD were automatically generated and sent to ACMS, then ACMS will automatically respond to this event trigger by searching for the appropriate part, automatically assembling a TDPL, and automatically initiating a TDP review workflow. In the event that the PRON and PWD are not received automatically, then the Configuration Manager will need to login to ACMS, find the part via search queries or product structure navigation, and initiate the assembly of the TDPL and links to the associated engineering data that makes up the TDP. Once the TDPL has been generated and the associated engineering data linked, the

Configuration Manager will initiate an appropriate workflow for review, validation, approval, and certification of the TDP.

5.4.2 Retrieve Supporting Technical Data. Upon notification of an outstanding task, the TDP reviewers will be provided with a means to identify outstanding workflow tasks. The reviewers will select a task on which to work and use ACMS to retrieve the data associated with the TDP. Data attached to the workflow task will be retrieved directly from ACMS' representation of the task. Any other technical or engineering data that the reviewer deems necessary will be located and retrieved using ACMS' query/search, product structure navigation, and check-out capabilities. For example, the result of the query will identify product data by its drawing, document, or other product data identifier. This data will include engineering drawings, models, simulations, specifications, standards, testing requirements, quality requirements required to manufacture an item, associated lists; process descriptions; and outstanding Notices of Revisions (NORs). Other examples of data include documents defining physical geometry, material composition, performance characteristics, manufacture, assembly, and acceptance test procedures.

5.4.3 Review and Update TDP. ACMS will enable TDP reviewers to view and mark-up or redline viewable images of the technical data. Where the TDP is incomplete or requires modification, ACMS will enable the Configuration Manager to create, store, and control new data or make revisions to the existing data. Often, either of these activities will involve participating in an engineering data review or an ECP workflow prior to releasing the data.

5.4.4 Assemble and Certify TDP. As part of the TDP validation workflow within ACMS, the Configuration Manager will be able to retrieve a TDP Certification Form. The Configuration Manager will fill-in the TDP Certification Form and electronically sign-off on the certification. Once the task is completed, ACMS will route the certification and validated TDP to the Inventory Manager, completing the TDP validation workflow.

17 Nov 97

AMXSY POINT PAPER

SUBJECT: Implementation Status of Joint Engineering Data Management Information Control System (JEDMICS)

PURPOSE: To inform the AMC Principal Deputy for Acquisition with the latest status of JEDMICS implementation at the major subordinate commands (MSCs).

FACTS:

At the previous ACMS Task Force meeting in Aug 97, at CECOM, you expressed an interest in being kept informed on JEDMICS implementation status and other significant issues. Below is a synopsis of the MSC and PM JEDMICS status briefings given at the 4-6 Nov 97meeting at TACOM.

AMCOM - Mr. John Montgomery and Ms. Carla Crawford briefed the status of the AMCOM JEDMICS implementation. AMCOM now has JEDMICS at full production. One hundred forty thousand (140,000) aviation and missile images have been merged into a single AMCOM JEDMICS. DSREDS has been dismantled. The AMCOM JEDMICS is supporting dual aviation and missile business processes, but the intent is to merge MICOM's MICAPP and ATCOM's TD/CMS in mid-December in order to support a single business process. Several issues were cited during the briefing. They include the following:

- A lack of personnel arriving from ATCOM to handle the TDP workload.
- Excessive down-time due to maintenance on the automated document library (ADL) Juke Box.
- Output performance rates are not sufficient.
- A new law has established criminal liability for disclosure of limited rights data. The nature of the law may make it impossible to grant support contractors access to limited rights data. This can impact the commands' ability to perform their work.

CECOM - Mr. Gary Salomon reported that none of the issues CECOM surfaced at the Aug 97 meeting have been satisfactorily addressed by JEDMICS. Those issues include:

- Requiring manual verification that all images are in the file before outputting to CD, Internet, etc.
- UNIX utility programs periodically fail causing system or job to stop and requiring system reboot.
- Platter copy function doesn't work properly.
- No capability to import various media deliveries in MIL-STD-1840A/B or CIT formats

He noted that CECOM turned DSREDS off in Jun 97.

IOC - Mr. Will Ensenat indicated that problems identified at the Aug 97 meeting still exist. He also reported that as a result of the Quadrennial Defense Review, Tobyhanna Army Depot is transferred to CECOM as an experiment. Mr. Ensenat noted the following barriers to retrieving data from remote sites:

- The network is slow.
- Some MSCs are reluctant to permit depots to directly access their primary repository (may be a fee issue).
- There needs to be a way to provide massive amounts of data from the MSCs to the depots.

RIA - Mr. John Bender briefed the status of the RIA JEDMICS implementation. He reported that RIA's JEDMICS has been operational since 1 Oct 95. Currently they serve 43 sites and have 1113 user profiles. Usage is increasing. From 1 Oct 96 to 30 Sep 97, they have logged 98,291hours of usage. Mr. Bender also reported that CDEX was installed in Sep 96 and, as of 30 Sep 97, had produced 18,481 compact disks.

TACOM-Warren - Ms. Patricia Martinez reported that TACOM-Warren switched to JEDMICS from DSREDS. Maintenance for DSREDS ended 30 Sep 97, but DSREDS is still occasionally used due to image and daemon problems with JEDMICS. JEDMICS continues to experience printing problems. TACOM-Warren has targeted the first week of Dec for disassembly of DSREDS. Ms. Martinez requested a copy of the JEDMICS site maintenance plan and contract wording so she will know what maintenance services and requirements PRC is under contract to provide.

TACOM-ARDEC - Ms. Carol Sitroon reported that TACOM-ARDEC has fully transitioned to JEDMICS. DSREDS has been shutdown and is scheduled for disassembly in Jan 98. Security of JEDMICS is one of their concerns. TACOM-ARDEC is restricting access and requiring users sign a four page non-disclosure agreement. They also are having problems with synchronization with TD/CMS. About 500 JEDMICS images still need to be cleaned up.

DoD JEDMICS - Mr. John Montgomery presented an update on DoD JEDMICS and Army priorities relative to that program. He indicated that the current release is version 2.5.2. PC JEDMICS's current version is 2.3. In an effort to improve the jukebox performance, they are developing a "multi-store" concept. A data call will be forthcoming. A mid-Dec test bed evaluation is expected with a solution deployed by Apr 98. The Oracle component of JEDMICS is Year 2000 compliant. They are looking to resolve other Year 2000 problems with release 3.0 which is due in Aug 98. There is still no JEDMICS funding line after FY98. Mr. Montgomery indicated that the Army priority items for JEDMICS included the following:

- C4 image fix
- Throughput performance improvements
- Digital data upload server
- Accompanying document management improvements
- Single point of failure (jukebox)
- Reduced number of workarounds (SPRs are prioritized, but no schedule has been published)
- Limited/priority rights access control
- Data platter backup processing (there are no funds for this)
- Deployment of data transmission protection software release

In summary, all MSCs now have full JEDMICS implementation. TACOM-Warren and TACOM-ARDEC still await disassembly and removal of their DSREDS equipment. This will be completed in Jan 98.

RELEASED BY: JAMES W. CARSTENS
Chief, Acquisition & Tech Support Div
DSN 793-5010

ACTION OFFICER:
GORDON NEY
DSN 793-6586

COORDINATION:
Considered

Revised ACMS Schedule

11 November 97	Receive comments on business problems and CONOPS
13 November 97	Telcon with Gayle Booker and Jim Rickenbaugh on CMIS requirements (8am)
14 November 97	Receive data call responses
26 November 97	Send out draft requirements for review and comment
15 December 97	Receive comments on draft requirements. Post on web site
12-16 January 98	Requirements Review Meeting at STRICOM. Possibly MIL-STD-2549 training
30 January 98	Send out draft Performance Specification for review and comment
13 February 98	Receive comments on draft Performance Specification
24-26 February 98	Performance Spec Review Meeting at Picatinney
13 March 98	Deliver Final Performance Specification